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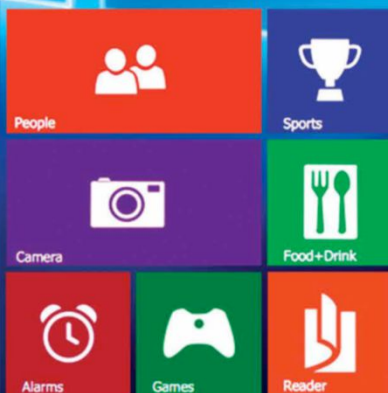
YOUR HANDY GUIDE TO EVERYDAY TECHNOLOGY

to Windows 10



Fast Track

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WINDOWS 10
SEPTEMBER 2015

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How to get Windows 10

With its “free upgrade” option for users of Windows 7 and above, Windows 10 looks like it is going to be the dominant operating system for a good while. This chapter will provide you with step-by-step instructions of how you can go about installing this new OS on your current system.

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Windows 10 has changed a lot of things. And now the time has come for us to sum it all up for you.

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We have all the answers

Have you heard of this new operating system by Microsoft called Windows 10? If you haven't it's probably because you don't use Windows, don't ever read the news, or you don't own a TV and you certainly don't have Internet access. Also, you don't have friends.

Because those are all vectors though which we have repeatedly been told, "Windows 10 is coming!" and in turn have asked things like "What's with Windows 10? What happened to 9? I heard Microsoft won't make Windows any more after this! Is that true? Are they giving it away for free? Anyway, when are you coming over for dinner?"

Inquisitiveness is something to be rewarded of course – we wouldn't be in the business if we didn't think so – and after the nth time you have been asked a similar questions as above, you tend to wonder where the questions are coming from. Why do so many people have these doubts?

Fact is, Windows 10 has devolved into a series of sound-bites which despite being accurate, don't give a very clear picture and only leave people with more questions – much like any other news topic these days.


If you've been having doubts of your own about the often rather ridiculous-sounding news around Windows 10, this FastTrack should lay those to rest. Even if you have been following Windows 10 news for a long time, and can recite build numbers, you'll most certainly find something of value in our Tips and Tricks, performance benchmarks and developer-centric chapters. Be it simple things like changing the download location of your new Edge browser to making Windows 10 more private – you'll find it all here.

In the end, our goal is for you to understand not only what Windows 10 brings, but why the changes it makes are significant even when they are

mostly invisible. We want you to know if what is brings is right for you, and whether you should upgrade.

Because for once it isn't just about fancy new features vs performance. Even how Windows is delivered and updated could have an impact on your decision to upgrade to it.

Besides the invaluable upgrade decision of course we have a quick primer on the multi-architecture history of Windows and some of the key feature highlights that are special to Windows 10 (and we don't mean the ninja cat).

So, if any of these interest you or are queries that you have, read on. 

A HISTORIC RELEASE

Windows 10 is a historic release for Microsoft. There is so much about it that is disruptive – some in good ways, some in bad – and so much about it that’s entirely new and unprecedented.

If you’ve been following the news surrounding Windows 10, then here is a sample of the kinds of headlines you have probably been reading over the past year:

- “Windows 10 will be the next Windows Release After Windows 8”
- “Windows 10 will be a Free Upgrade for Windows 7 and 8 Customers”
- “Windows 10 will be the last Version of Windows”
- “All Future Upgrades to Windows 10 will be Free”
- “All Updates to Windows 10 will be Mandatory”
- “Windows 10 Available for Raspberry Pi 2”
- “Windows 10 Shares your Wi-Fi keys with all your Friends”
- “Candy Crush Saga will come Pre-installed on Windows 10”
- “Solitaire in Windows 10 is a Free-to-Play app with Subscription”
- “Faulty Update puts Windows 10 in Reboot Loop”

Just a few years ago, any or all of the above would have been the kind of headlines that would have made for nice April Fool's Day prank articles. As of today they have all been realised.

In the end though, they are mere headlines, the reality behind them is a whole lot more nuanced than can be captured in a few words. Hopefully that nuance should become more apparent as you read further into this Fast Track.

There are some things that immediately stand out when it comes to Windows 10. First of all, what's with Windows 10 being free? Also what happened to Windows 9, and why is everyone saying that Windows 10 will be the last version of Windows?

Why Free

On first thought giving away Windows 10 for free seems like a huge loss of money for Microsoft, why would they do it? Why the sudden charity? What's next an open source Windows!

First of all, this is a new Microsoft, one that has been warming up to open source, to the extent that despite an open source version of Windows is still an impossibility at this point, it no longer feels like that will never happen.

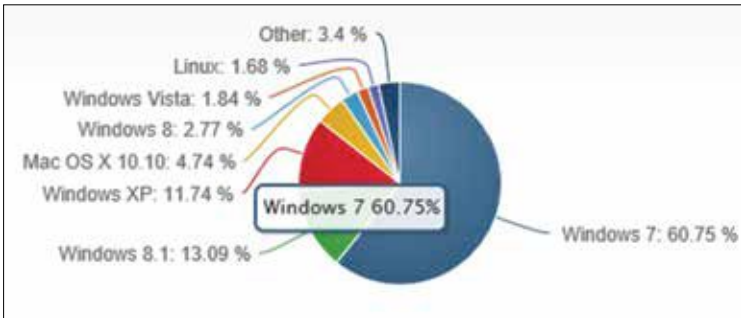
Even so, giving Windows 10 away isn't an act of charity, it simply makes sense for Microsoft given their goals. Their goal being to unify the Windows platform such that all Windows devices run the same core OS. Imagine instead if Microsoft had announced a huge marketing budget of billions of dollars for their next OS, few people would bat an eyelid. What better way to get people to adopt a product than to give it away for free? Also, let's see where exactly Microsoft stands to lose this money.

Consider this fact, despite being around for a couple of years, Windows 8 only managed to achieve a meagre lead over Windows XP. Why?

The current batch of Windows users is made up of three kinds of users:

The first who purchased a new device and either got Windows 8 with it, or bought a retail copy separately and got Windows 8 / 8.1. The second batch of users are those who purchased a Windows 8 upgrade for Windows 7 or 8. And of course, as the good old saying goes, nothing is certain but death, taxes and piracy; the third group of users are those who pirated Windows 8.

So the potential adopters of Windows 10 are also likewise of three kinds, those purchasing a new device, those running an older versions of Windows on their device, and finally those who'll pirate the OS. The pirates always



Operating systems market share

get Windows for free and don't give Microsoft any money, nothing new there, so we'll leave them out.

Now, Microsoft hasn't made Windows 10 entirely free. If you buy a new computer with Windows 10 on it, or you are building a new computer and you want to get a copy of Windows 10, you still pay for it. Microsoft is still making money from new customers and new devices, and new licenses. No loss for Microsoft there.

Then there are those running older versions of Windows. Amongst this group, not all would have been interested in purchasing an upgrade. After all there are still many people running Windows 7, XP and Vista (yes there are some people still using Vista). These people weren't going to give Microsoft any more money anyway so what does Microsoft lose by giving them Windows 10? Just a little bandwidth, which those users use up any way with Windows updates. Finally we have those who are running older versions of Windows, and who would be the kind to fork out money for an upgrade.

This is not a very large audience to begin with. After all Windows 7 kept gaining a share despite the release of Windows 8 and 8.1, meaning that a majority of the growth of Windows 8.x came at the expense of XP, from new purchases.

By giving away Windows 10 for free Microsoft is sacrificing the money it would get from those who would pay for upgrades, but in return they are converting Windows 7, 8 and 8.1 users into the unified base of Windows 10.

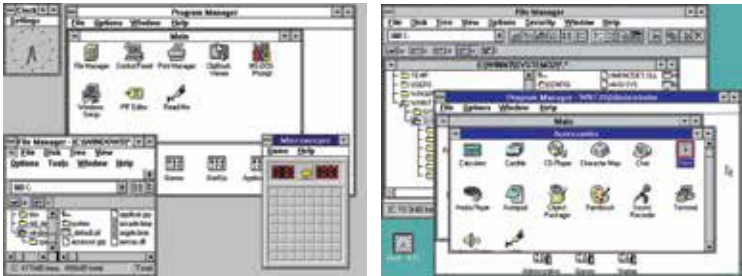
Their best case scenario is that all users running Windows 7, 8, and 8.1 move to Windows 10. Those running XP and Vista probably don't have computers capable of running newer OSes or they just want to stick with what they know. Besides, if those users really want to upgrade, they still

can, for a price. Of course not everyone is going to upgrade to Windows 10, despite it being free, but Microsoft is likely to get a whole lot more people upgrading than usual, thanks to the free offer.

Why 10

Windows 10 makes perfect sense as the name for the successor to Windows 8, in the sense that Microsoft's naming conventions have never made sense. Let's take a brief look at the history of Windows releases to see Microsoft's unentangleable mess of Windows versioning.

After a tepid response to Windows 1.0 and Windows 2.0, Microsoft hit it big with Windows 3 and 3.1. So popular were they that Microsoft made another somewhat incompatible version of Windows that they called Windows NT 3.1.



One of these is Windows NT 3.1 and the other is Windows 3.11 guess which is which (there is a hint in the image)

At this point the Windows line essentially split in two. On one hand you had Windows 3.x that was targeted towards consumers, which was succeeded by Windows 95, and on the other hand you had Windows NT 3.1 that was succeeded by Windows NT 4.0 that was targeted towards servers and workstations.

Windows 95 led to the popular Windows 98, while for inexplicable reasons Windows NT 4.0 led to Windows 2000, which was internally labelled as Windows NT 5.0. With the dates now used for their workstation and server offerings, Microsoft started getting creative with their branding. The successor to Windows 98 was Windows ME, or Millennium Edition, named for how long it would take to accomplish anything on the crash-happy OS. Those who consider Vista a disaster might sing a different tune if they encountered Windows ME.



Windows 95 introduced a UI paradigm that has been used by all versions of Windows since, with some deviations in Windows 8 / 8.1

DOS-based ones for home users, and the NT-based ones for servers and workstations into a single NT-based OS family – something they wanted to do since NT was first introduced.

Then came another OS that most people would like to forget, but one that lay a lot of important groundwork for what Windows is today, and that is Windows Vista. Internally Windows Vista and Windows Server 2008 featured Windows NT 6.0 and this is somewhat significant for reasons that will become clear soon.

When Windows 7 came out, the name made sense given that Microsoft wanted to go back to version numbers, and that the previous version was internally Windows NT 6.0. However Windows 7 wasn't very different at its core, and was mostly compatible with Vista. Since the kernel was mostly the same internally, Windows 7 only updated the Windows version to NT 6.1. So when Microsoft finally updated its branding to reflect the version of Windows beneath it, well the version of Windows beneath it no longer followed the same numbering scheme! Windows 8 bumped this version to 6.2 and then Windows 8.1 brought this up to 6.3.

Windows 7 is the most popular version of Windows ever released, but it was basically Windows Vista.1

Now we come to Windows 10, and you probably feel

Quick on the heels of Windows ME came Windows XP, that despite its age and obsolescence still runs on a significant number of computers. Internally Windows XP was based on Windows 2000 and was versioned as Windows NT 5.1.

At this point the old lineage of DOS-based Windows versions was over as Windows XP merged Microsoft's two lines of products, the



Windows XP was the first consumer version of Windows to use the Windows NT kernel.



Windows 7 is the most popular version of Windows

comfortable betting that Windows 10 will internally be Windows NT 6.4. You are wrong, and we are most happy to rub this in your face. Windows 10 is in fact Windows NT 10.0 as well. To be fair to you though, early builds of Windows 10 actually represented themselves as Windows NT 6.4 and Microsoft might have stuck with that.

So to all those asking, what happened to Windows 9, we only ask in return, what happened to Windows 5 and 6? Heck what happened to Windows kernel versions 7, 8 and 9. Also Windows NT started at version 3, so what happened to Windows NT 1 and 2? If you count regular consumer versions of Windows, then Windows 7 is the 9th release (1.0, 2.0, 3.0, 95, 98, ME, XP, Vista and then 7). If you look at kernel versions then it is 6.1, what it isn't is 7 in any way other than in name.

Let's just say version numbers are arbitrary and misleading, and like the 'XP' in 'Windows XP' or the 'Vista' in 'Windows Vista', the '10' in 'Windows 10' is just branding, a pure marketing tool. After all, 10 is a 'cool' number, it's the number nails most people have growing on their hands, that's probably where that comes from, it's as reasonable a theory as any alternative.

Why the 'Last'

Is Windows 10 the last version of Windows? The idea of no more Windows versions seems odd. It depends on how you look at version numbers though. As we just explained, Windows 10 is now simply the brand name for Windows.

If Windows were a game franchise, then Windows 10 would be like that reboot that drops all sub-titles and numbers. Windows is now simply 'Windows 10' and it is that product that will receive constant upgrades.

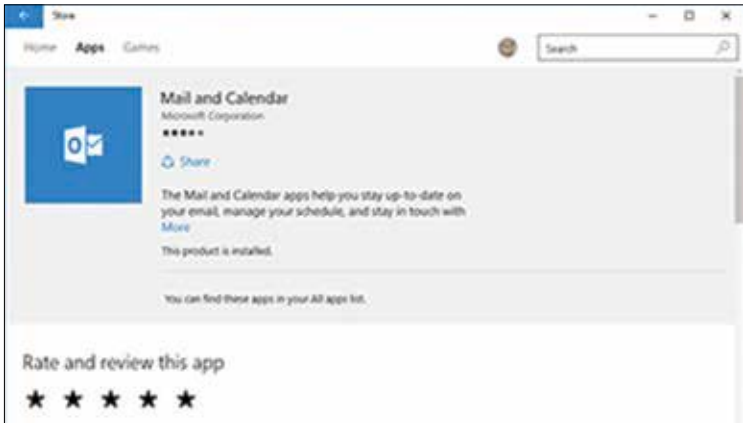
There is a comparison to be made with Apple's Mac OS. Before Mac OS X, there once was 'Mac OS 9'. Ever since the release of Mac OS X though, Apple has been releasing major new operating system releases under the OS X name. In fact with the release of OS X Mountain Lion or 10.7 Apple dropped the 'Mac' and called it simply 'OS X'.

Much like the OS X of today is wildly different from the initial Mac OS X release nearly 14 years ago. Windows 10 might easily still be called Windows 10 in another 14 years, but it will likely be a completely different OS.



While there are definite similarities between the OS X of today, and Mac OS X when it launched, it's still come a very long way.

Where Microsoft's approach differs from that of Apple is that Microsoft is also changing its release strategy. In previous versions of Windows, updates would generally only fix things, bugs, security, performance etc. Once there were enough updates they would be bundled together as a Service Pack. This was supposed to be devoid of any new features, but Windows XP SP2 famously bucked this trend. Likewise Windows 8.1 too brought significant changes.



The basic apps that ship with Windows 10 can be installed and updated from the Windows Store.

With Windows 10, Microsoft no longer differentiates between updates that fix the OS and those that add new features (and possibly new bugs). In Windows 8 we saw some of this in the form of apps that Microsoft shipped with the OS getting updated with new features through the Windows store separate from the OS. Now the entire OS will work the same way.

Microsoft will keep releasing updates to its core apps through the Windows 10 store, and will keep updating the core Windows 10 experience through new builds delivered via Windows Update.

People were understandably confused when Microsoft made a Windows upgrade free, and then started talking of Windows-as-a-Service and of constant new upgrades. The first thought everyone had was that after the first free year of the upgrade, Microsoft would start charging for upgrades. This notion was probably a fundamental misunderstanding of what Microsoft is trying to accomplish brought on by their own poor communication.

To clarify then, when you buy Windows 10, or upgrade to it for free from Windows 7, 8 or 8.1 you get a license to Windows 10 that includes all upgrades to the OS for free. It is a service, but the kind that has a one-time payment that is included in the price of the device you purchase, or the retail license for Windows 10 that you purchase.

Perhaps what is more interesting today is not that the Windows 10 upgrade is free, and that it is the last version of Windows, or that it now uses a Software-as-a-Service model, but that all of these things make sense (to an extent) given the ecosystem of devices today.

A NEW ECOSYSTEM

Windows 10 will have perhaps the biggest impact on the Windows ecosystem, and believe it or not it owes a lot to Windows Vista.

As you probably read in the previous chapter, Windows 7 and Windows 8 were both largely based on, and compatible with Windows Vista. As we also discussed internally the version of Windows Vista was NT 6.0 while that of Windows 7, Windows 8, and Windows 8.1 were 6.1, 6.2 and 6.3 respectively. In fact, even Windows 10 was initially given a version of NT 6.4 before Microsoft decided to number it 10.0 instead. However, this isn't because the core kernel of Windows has changed immensely.

However different they might have been in appearance, behaviour and performance, Windows 7, 8, and 8.1 internally represented themselves as minor point updates to Windows Vista (6.0) to signal to apps that the OS was compatible with Vista. Microsoft knew that Windows 7 and 8 were fully capable of running Windows Vista applications, so they in a way lied to these applications so these applications would run despite being written at a time when these new OSs were not even released. So does Windows 10 signal a break in compatibility? Not really.

Evolution and Compatibility

Compatibility with previous versions of Windows is a very important aspect of Windows. Over time Windows has added and removed features, but has always tried to keep compatibility wherever possible and feasible. For instance, 32-bit versions of Windows 10 still support applications developed for 16bit versions of Windows and DOS!

64-bit versions of Windows meanwhile haven't been able to support 16-bit applications since as far back as XP. If those applications (written for the Windows 3.1 era) are compiled into a 32-bit version, they will still run on Windows 10!

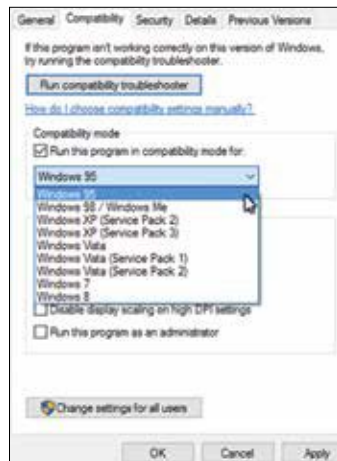
The main reason for this is that Windows has become quite good at lying about its version number to suit the app running on it. For a long time Windows has had the capability of representing itself as an older version for compatibility with old applications. Windows mostly tried to be good at detecting if an application is written for a previous version of Windows, and then running it in compatibility mode.

If you encounter an app that worked on a previous version of Windows, but no longer works in the latest release, you can right click it and select compatibility settings. This includes not only lying about the Windows version to trick the application into thinking it is running on a compatible version of Windows, but also reducing the colour mode and resolution to make it work.

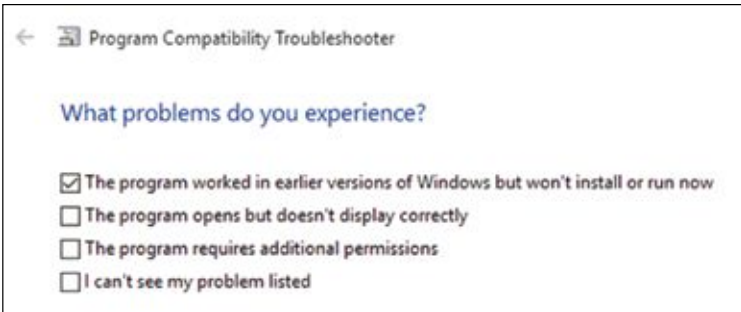
Since Windows already has a framework in place to do behave like older versions of Windows and lie about its version number to run older apps, does it really matter what the correct number is? Might as well go for something that makes more sense.



A 32bit version of Ski free, a Windows 3.1 game running on Windows 10 64bit.



You can right click and set compatibility settings for any application.



Windows also includes a compatibility troubleshooter that walks you through running an old program on the latest Windows release.

So in Windows 10, compatible applications will get Windows 10 as the version number while older apps will get the version number that they are most comfortable working under. Windows 10 will keep changing over its lifetime and as such Microsoft has given developers tools to detect what features it supports, rather than guessing that from the version number.

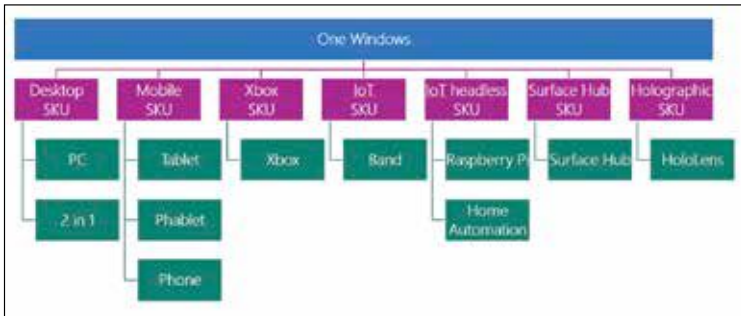
Thanks to the continuous efforts in not breaking compatibility, each version of Windows expands its ecosystem, and Windows 10 actually does this a lot more than previous versions. To make this possible though, Windows has gone through many architectural changes.

Architectural Changes

The earliest versions of Windows were essentially applications running on top of DOS rather than being full operating systems. It was Windows NT 3.1 that first got away from a DOS core and switched to the NT kernel that is still used today. It introduced the Win32 API that still powers most Windows applications.

Unfortunately, when Windows NT 3.1 was originally released it had unusually high system requirements, such as a recommended 16MB of RAM,! Shocking, we know. This among other reasons meant that Windows NT didn't become viable for consumer versions of Windows until the release of Windows XP in 2001. That is when the consumer and workstation / server versions of Windows merged into a single family of operating systems. Another such historic merging came with Windows 8.

While we focused on desktop versions of Windows in the previous chapter, there were other operating systems that Microsoft created. Win-



Microsoft intends to share the same core OS across as many hardware platforms as possible so that developers have an easier target.

dows CE for instance was Microsoft's OS for handheld devices and other consumer electronics. It is what powered mobile versions of Windows, such as Windows Mobile and later Windows Phone. Another historic merging came with Windows 8 and Windows Phone 8, which both used the same Windows NT core. With Windows 8.1 they got even closer. Another device that joined the Windows family was the Xbox One, which now runs a Windows NT kernel.

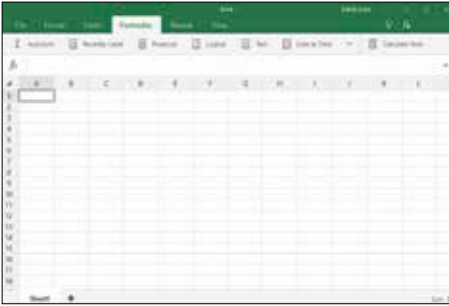
Microsoft earlier was using different OS core for Xbox 360, another for their Mobile devices and another for their desktops. Now all their devices are part of the Windows family and the Windows ecosystem.

With Windows 10 Microsoft has converged the Windows 10 family even tighter. As the Windows ecosystem expands to include new kinds of devices such as the Xbox One, the Raspberry Pi 2, and soon the HoloLens, the common bits of code that Windows is running on these devices has now expanded.

Microsoft has identified the core bits of functionality that any device running Windows should have and has made them part of what it calls the Windows Core. This is more than just the NT kernel, it includes common functionality such as support for input and output devices, that is common for all platforms.

The Universal Windows Platform

This is what Microsoft calls its Universal Windows Platform. It is the core functionality that developers can expect to find on any Windows device. This is something developers can rely on when making Windows apps. An app



The Microsoft Excel for phones is a UWA that can run on mobile and desktop.

that just uses the functionality presented by the Universal Windows Platform can run on all Windows 10 devices, even those that haven't been invented yet.

On top of this core Microsoft can extend the Windows experience based on the 'device family'. For instance, embedded devices such as

Raspberry Pi need bare minimum functionality, then come Mobile devices that need support for bluetooth, NFC etc. Then you have the PC family that includes tablets and convertibles that run the traditional Windows desktop UI experience and provide the traditional Win32 API as well. You also have the Surface Hub, Microsoft's large 55-inch and above multi-touch interactive whiteboard solution for enterprises, that has its own set of features that developers can use. Also soon you will have the HoloLens, which too will run Windows 10 while providing a completely different experience.

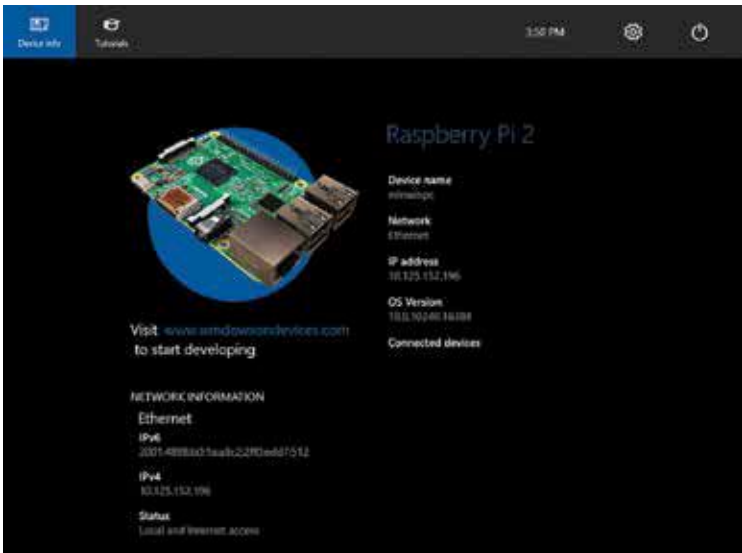
This allows application developers to create applications that can run on any Windows device while using the same codebase, and in some cases even the same binary. If an application uses only the features available in the Windows Core, then it will simply run on all devices since they all include the Windows Core. If it uses features present only in one platform, it can detect those features at runtime and adapt its functionality and interface accordingly. Even for the UI, Microsoft has some support for adaptive interfaces which will let developers create interfaces that can run on all devices, from a 5-inch mobile to a 55-inch surface hub.

Let's look at some of these new entrants to the Windows ecosystem.

Windows 10 for IoT

For those hardware tinkerers with Raspberry Pis and other similar devices, Microsoft has released a new edition of Windows that can run on those devices. What's more, Microsoft has made this edition available for free to play around with.

This edition of Windows is probably closest to the Windows 10 core, as it features no desktop mode, or even a CLI. You can however write applica-



Windows IoT running a demo application on a Raspberry Pi 2.

tions using the free Visual Studio Community edition and push them to a Raspberry Pi 2 running Windows 10 IoT.

While the IoT edition doesn't include many key features, it does include stuff like the speech recognition and synthesis technology behind Cortana (though not Cortana itself). This means you can use applications on the Pi 2 that can recognise speech commands, and speak out text on the Raspberry Pi 2 device.

The IoT versions also include support for other kinds of input, for instance you can connect a keyboard, mouse or even a touchscreen and use that on your device. It also includes the handwriting recognition capabilities that ship with Windows.

Windows Holographic

Microsoft has touted its new holographic technologies a lot, but are as yet not commercially available. However, the holographic version of Windows is once again just Windows 10 at the core with all the functionality that would be required for a holographic device layered on top of it.

This device will be able to run the same Windows apps as any other Windows device, but with the added holographic support. This is some-

thing Windows apps will be able to detect and accordingly adapt their UI to.

There isn't too much known about Windows Holographic yet, but given that it is Windows 10, we can assume that it will have all the features of Windows Core.

Windows as a Service

Another major change to the Windows ecosystem is that eventually it will consist only of Windows 10.

Currently the only Windows version of importance is Windows 7. Windows XP is declining and it won't be too long before it entirely disappears. Windows Vista is already a blip in the statistics. Even now Windows 8 and 8.1 make up only around 15% of OS installs; not much more than XP. Windows 8 was considered a flop and with Windows 10 out, it is unlikely that people will go out of their way to purchase it.

What this leaves us with are two operating systems, Windows 7, and Windows 10. If Microsoft's free upgrade ploy works well, at least some of the current Windows 7 users will move to Windows 10. Even otherwise mainstream support for Windows 7 has already ended, and extended support will end in another 5 years.

Windows 10 of course will still be around then, and it will still be the latest release of Windows available. Eventually, Windows 10 will be all that is left giving developers a single platform to base their applications on.

The Windows 10 core will upgrade over time, and include new features that will reach all supported Windows platforms. Windows' design is more modular now, so these updates can be asynchronous.

What this means is that unlike before, where the release of Internet Explorer, or heck even something as trivial as Notepad was tied to the release of a new Windows version, now Windows apps can keep updating like regular third-party apps via the Windows Store. The version of Edge doesn't even matter now (its 20.10240 as of this writing) as it will keep updating, and all you will notice occasionally is that it has new features. Just like any other browser.

This is where Microsoft's version of a Windows-as-a-service comes in. It's not a traditional service model where you pay monthly or yearly for a service, but one where you pay a one-time fee for a 'lifetime' of updates.

Like anyone offering a lifetime subscription, it's important to read the fine print. In this case it boils down to the following:

1. Updates are mandatory
2. Upgrades are mandatory
3. Devices that don't upgrade won't be supported
4. Upgrades are cumulative
5. If an upgrade isn't supported by the hardware it won't be installed

Let's explore what these really mean and how they can interact with each other in ways you might not like.

First of all, mandatory updates are a GOOD thing. Here by updates we mean security patches and bug fixes. These fixes make Windows more secure and that has an effect on not only individual devices, but the entire ecosystem.

In the field of immunology there is a concept called "herd immunity". If a person vaccinates themselves against a disease, they are safer against it. However, sometimes some vaccines don't work on some people. Other people might be allergic to a vaccine, and as such unable to get a shot. So not everyone can be vaccinated, and not everyone who is vaccinated is immune to the disease.

However, if enough people get vaccinated, then the chances of the disease spreading are greatly reduced. This has the effect of protecting even those people for whom the vaccine didn't work, or those who couldn't take it.

Software patches, especially security patches are quite similar. A patch might not work for everyone, everyone might not install it, and for some people it might actually cause problems. However, if enough people install the patch the overall security of the Windows ecosystem improves, and the chances of malware spreading are reduced.

So yes, updates are good, mandatory updates are good, even if in a few cases they might cause people problems. These



Delaying upgrades is just that, delaying the inevitable, unless you are fine with an unsupported, unpatched Windows.

kind of updates are mandatory for all users, even those using Windows 10 Pro.

Then come upgrades. Windows 10 will occasionally release updates that bring new features and functionality to Windows. While this is great for people who want it, it isn't generally what people expect from their OS. If people bought Windows 7, and were one day pushed a build of Windows 8, because that's the direction Microsoft wanted to go in, then they would be rightly upset. They would be even more upset if they had no control over this decision.

Of course Microsoft has put systems in place that prevent such a thing from happening. They have something called the Insider track which we shall talk about shortly.

A lot has been said about how only Windows 10 Home users are forced to install upgrades, but this isn't entirely accurate. Windows 10 Pro users can choose to delay upgrades, but eventually, in a few months they will be forced to upgrade Windows.

Of course there will be tools available to block updates and upgrades. To make sure that there is a better sync between Microsoft and its customer base, Microsoft now has as constant pool of beta testers who have access to upcoming features before release. Microsoft calls this their Insider program, and we'll talk about it in more detail shortly.

However here is where the kicker comes in, blocking updates makes your OS unsupported, and that might not be a desirable option for everybody.

As we mentioned upgrades are also cumulative. This might be obvious, but each upgrade will build on the previous one, which means you cannot install a newer upgrade without installing the previous one. Again this is quite obvious, but it has a negative effect as will become clear.

The final point is that when Microsoft says that Windows 10 upgrades will be free for the lifetime of a device, it's really important to understand what they mean by lifetime. If you install Windows 10 on a device, and over the course of a few years Microsoft releases an upgrade that brings changes to Windows that increase its system requirements, or changes that conflict with your hardware, then your system cannot upgrade.

Since updates are cumulative, you might be locked out of not only future upgrades to Windows, but also future security patches. At this point of time your device has reached the end of its 'lifetime' of support.

Windows Insider

With new upgrades to Windows coming out constantly Microsoft needs

some way to get user feedback and real-world data about upcoming builds of Windows before they are delivered to the general audience. For this purpose, they have the Windows Insider program.


Microsoft has always had some kind of beta program for people to test out its upcoming operating systems. Even with the very first release of Windows NT 3.1 Microsoft had beta versions of its OS available for select audiences.

Over time this audience has expanded significantly, to the point that now the only requirement to be a Windows beta tester is that you want to be one. Anyone can sign up to be a Windows Insider, and in Windows 10 you can turn switch on beta updates with a few clicks.

What Microsoft is doing with Windows 10 upgrades is similar to what has been happening with browsers for a while now. Firefox and Chrome both have multiple builds available. You have Firefox Nightly and Chrome Canary that both release unstable, minimally tested builds very regularly (nightly in Firefox's case). Then you have a better tested, but still quite frequently updated track: Firefox Aurora / Developer Edition and Chrome Developer. Then both browsers have a Beta track, and finally you have a release track. For enterprise users, both browsers also have editions that are updated less frequently.

The Windows 10 insider sign up process is quite simple. All they want to know is if you are really sure about using untested builds that might blow your computer to bits.

In Windows 10, an option is to join the Insider program, and then select the 'Fast' option for how often you want upgrades. Then you have the 'Slow' option, which still delivers beta builds but less frequently, after they are more tested. Then you have the regular release track that Windows 10 Home users are locked into, unless they want to get even faster updates in the Insider track.

Windows 10 Pro and Enterprise users can use an option to defer updates, which keeps security updates coming, but delays Windows 10 upgrades a few months till they have already been tested by Insiders, and regular customers who can't or haven't delayed upgrades. 

TO UPGRADE OR NOT TO UPGRADE?

That is the ultimate question on everyone's mind right now.

Fret not. We help you make an informed decision.

For most Indians, upgrading to the latest version of Windows has always been a task filled with trepidation. Besides the obvious concerns of potential compatibility issues – hardware- and software-related – the biggest source of hesitation is the price. Not many are excited with the idea of having to pay thousands of rupees for software, which in the case of Windows, has ranged anywhere between a starting price of ₹6,000 (for OEM/Home Editions with a student discount) rising up to exorbitant rates of even ₹18,000 (for Professional and Ultimate Editions).

Fortunately, the tech gods have blessed us with some excellent news. For the first time in history, Microsoft is providing users running an activated copy of Windows 7, 8, or 8.1 with the option to upgrade to Windows 10 via

a digital download for FREE. That's right. Windows 10 will not cost you a single rupee (unless you factor in the bandwidth cost of downloading a 3 GB file). Excited? Of course you are! Skeptical? Well you should be; especially since this is the same company that just a few years ago charged its users \$199 to upgrade to a Professional Edition of Windows 7.

Furthermore, Microsoft has stated that this version of Windows will be the "last". While it goes without saying that users will continue to receive updates for optimizations and bug fixes, the general interface and feature list may remain largely the same. To help alleviate your fears of upgrading to this latest and (in all probability) final retail version of Windows, we have taken the trouble of answering some common questions you might have before you click that "Upgrade Now" button.

Why has Microsoft taken such a philanthropic turn? Surely there must be some catch as to why this upgrade is "free".

Surprisingly, no. And for this, there are a number of reasons. According to some analysts, offering a free upgrade is bound to spur consumer adoption, which in turn will ultimately benefit Microsoft. Furthermore, the faster Windows 10 expands its active user base, the more non-Windows users will be encouraged to purchase a copy of Windows. Further, as more users shift to Windows 10, the number of Windows 7/8/8.1 users will gradually reduce. As a result, these versions will receive fewer updates as Microsoft shifts their focus to improving the overall user experience of Windows 10. This will eventually force users to upgrade their systems to an operating that will undoubtedly be better supported.

As we discussed in the first chapter from a fiscal point of view, the decision to allow existing users to upgrade for free might not hurt Microsoft as much as people think. Microsoft will still continue to make money from the sales of new PCs that will come preloaded with a copy of Windows 10. In fact, most home users will be running an OEM version of Windows 7/8/8.1, which unfortunately cannot be reinstalled on a new/upgraded system. In essence, OEM licenses are tied to the system/motherboard on which they are installed. So users buying an upgraded system with Windows 10 will invariably be paying for the new OEM copy they are receiving.

The tides of technology are slowly turning. The rise of the smartphone has seen users pining for an integrated ecosystem where they can get a unified experience across all their devices. Apple is trying to answer this

call with iOS and OSX catering to all iPhone, iPad, iMac and MacBook users. Similarly, Google has delivered an extremely popular and versatile smartphone platform with Android. However, they are still miles behind Microsoft when it comes to providing a productive desktop-based OS (Chromium just doesn't cut it).

Enter Microsoft and their master plan of mobilizing its user base to a single, unified platform. This unification will translate to reduced efforts toward maintaining software compatibility across multiples operating systems while providing easier deployment of security fixes. For users, this means a more seamless multi-device experience. Imagine working on a presentation at home on your desktop, adding the finishing touches on your phone while on the way to the meeting, and using your Surface tablet to control the slide show. It is easy to foresee users purchasing Windows devices if they are promised such an integrated, hassle-free multi-device experience.

Are there any exceptions as to who can receive this upgrade for free?

Yes. The upgrade is only valid for Home and Pro editions of Windows 7/8/8.1 (OEM included). So entrepreneurs or business owners who plan to upgrade their organization's systems to the Windows 10 ecosystem will have to negotiate for a renewed Enterprise license deal. Similarly, home users running a copy of Windows XP or older will have to shell out full price for the upgrade. As it stands, Microsoft has no plans to offer any discounts to those using licensed copies of legacy versions.

How do I know if my PC qualifies?

First, there's the question of minimum system requirements. Fortunately, you are spared the need to upgrade your system's configuration if it was already capable of running Windows 7 and above as Windows 10 has the exact same requirements. On the other hand, if you plan on installing it on a system running Windows XP or older, do ensure your system meets the following requirements:

- ◆ 1 GHz (or faster) processor or SoC
- ◆ 1 GB RAM (for 32-bit) or 2 GB RAM (for 64-bit)
- ◆ Free hard drive space of 16 GB (for 32-bit) or 20 GB (for 64-bit OS)
- ◆ DirectX 9 (or later) graphics card with WDDM 1.0 driver
- ◆ Display with a resolution of 800x600 (or greater)

I am comfortable using my current version of Windows. Since the upgrade is free, can I wait a few years before upgrading?

Well, if you want the upgrade for free, then NO. Microsoft has categorically stated that all Windows users eligible for the free upgrade should claim it within one year of Windows 10's release date. So ensure you upgrade before July 29, 2016 or be ready to pay full price.



Yes, it really is free. And no, there is no subscription model

I am on the fence regarding whether I should opt for the upgrade. What features do you think will sway me towards upgrading?

Revamped Start menu and Action Centre

After the debacle that was the Metro UI introduced in Windows 8, Microsoft has thankfully decided to go back to basics by reintroducing the Start Menu, albeit with a few added features. Users can choose between a no-frills Start Menu, reminiscent of that in Windows 7, and a more modern looking one that adds a condensed tile interface for quick access to apps and services. In addition, the new Action Centre provides a seamless interface for



How we missed you, Start Menu

viewing notifications (which are also synced across any other Windows devices that you own).

Better Desktop and Window Management

Something that users had been crying out for was better multitasking support, with the number one requested feature being multiple virtual desktops. Microsoft has answered the call, and Windows 10 comes with seamless virtual desktop support and improved window-snap management. Expect higher productivity and a more intuitive interface.

Microsoft Edge

When news broke that Microsoft was aiming for a complete overhaul of Internet Explorer (a browser so hated, it was almost hipster to use it), many a head turned in anticipation. Microsoft Edge promises faster and safer browsing without the need to download a third party application. However, it will take considerable time and effort (as well as a few good plugins) before it replaces Chrome and Firefox as most people's default browser.



Bye bye, beloved widgets

As a Windows 7 or Windows 8 user, are there any removed features that I might miss after the upgrade?

Desktop Gadgets

Users who upgraded from Windows XP to Windows 8 will have missed the useful desktop gadgets introduced in Windows 7. The built-in ones allowed you to check the weather, get updated stock quotes, monitor system resources, and even control your media player. Windows discontinued this in Windows 8 and it does not look like they have any plans of bringing them back in Windows 10. There is a third-party application called 8Gadgetpack that does provide gadget support for Windows 8/8.1 (and possibly even for Windows 10) but if you're a purist, then sticking to Windows 7 is your best bet.

Windows Media Center

Released in 2002, Window Media Center was Microsoft's solution for a unified media consumption utility. Unfortunately, the painful setup procedure, outdated interface, and competition from other software like XBMC (now Kodi) and NextPVR is what led Microsoft to eventually discontinue support for it. If you are part of the very niche group still using Media Center, consider switching to an alternate, especially if you plan on upgrading to Windows 10.

Solitaire, Hearts, and Minesweeper

Windows 8 users have already been heartbroken by the absence of these iconic time wasters, and it seems Microsoft still sees no need to add preloaded games to Windows 10. However, you can still the official version of Solitaire and Minesweeper from the app store. Just be ready to deal with annoying ads, which for some bizarre reason, can be removed by paying \$1.49 a month. Good luck making money with that tactic, Microsoft.

That's all nice, but this is Windows we're talking about. Surely there are some reasons why I should not upgrade.

You don't want to be a software guinea pig

Despite its long development cycle, Windows 10 is still a relatively untested operating system. And like any software, it is always best to wait a while till after it has been tested on multiple systems with different hardware-software combinations. Before upgrading, make a list of all the applications you use and check if they are compatible with Windows 10. If not, it would be best to wait till the developers push out a compatible versions or till a Windows updates fixes it. Though as you have learnt from the previous chapter, most software won't have any issues with compatibility.

You own old peripheral hardware

Chances are that if you own decades-old peripherals like printers and scanners, you may have already given this a thought. Windows is infamous for not ensuring the compatibility of present day drivers with vintage devices, mainly because the trade-off between effort taken to ensure compatibility and number of users that actually use old hardware is not very profitable. So before you hit the upgrade button, do some research as to whether that old printer has drivers compatible with Windows 10. If you're out of luck, your options would be to either to upgrade Windows and switching to new

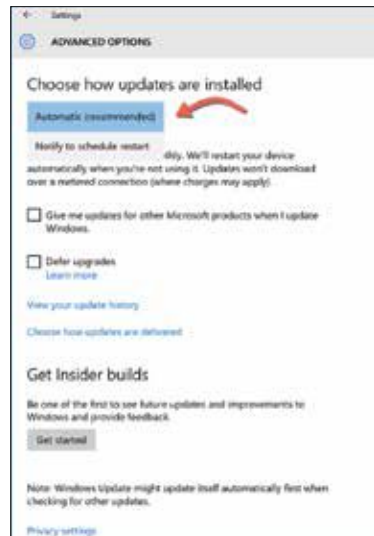
hardware or staving off the upgrade so you can squeeze out a few more years out of your peripherals. Of course, there's always the possibility that the manufacturer decides to release compatible drivers within the free upgrade window.

You own a preassembled system/laptop with hardware that is notorious for its poor driver support

Not all laptops and systems are built with premium hardware and peripherals. If you own a device manufactured by a relatively unknown company, then chances are you are familiar with the experience of hardware being broken after a driver update. In the same vein, many laptop owners have complained about basic Windows features being broken on day 1 of the update's release. For example, some Lenovo users have complained about reduced audio levels and broken Dolby audio. Others are reporting frequent Wi-Fi disconnections, poor Bluetooth connectivity, and the list goes on. To ensure you are not among the poor saps tempted to smash their laptops on the wall, Google your laptop model number and check if other users are facing similar problems.

I think I am ready to upgrade my system. Is there anything else I should keep in mind before going for it?

Well there is one small caveat introduced in Windows 10 that Microsoft is hoping will be more pros and less cons: Users will not have the option of restricting automatic Windows updates. You heard correct. Provided you are connected to the internet, Windows will automatically download and install updates in the background, which will be applied after a system restart (for which you will be notified). Windows 10 Pro and Enterprise users will at least have an option to schedule these updates, similar to how it works



This is sure to ruffle some feathers


in current versions. However, they too will not be able to permanently delay the update, unless (ironically) Microsoft decides to add such a feature in a future update.

Unsurprisingly, this decision has been met with serious derision from the tech community, in particular, app developers. Some may argue that by ensuring all systems are updated, developers can ensure their apps will remain compatible for all users. The other side of this coin is that updates can also cause certain apps to break. Developers can no longer rest with the knowledge of creating an app that will not fail as a result of factors out of their control. Upgrade only if you are willing to live the constant risk of an essential app breaking functionality, and waiting till (hopefully) a fix is released.

No support for SecuROM and SafeDisc DRM

Microsoft has stated that games using old, unsupported DRMs such as SecuROM and SafeDisc will not be supported on Windows 10. These DRMs have not been supported for years and their drivers have consequently been left unupdated. These drivers pose a “possible loophole for computer viruses” according to Microsoft’s German Marketing Manager, Boris Schneider-Johne, and hence any software requiring the use of these drivers will not work.

These DRMs were well known for the sheer inconvenience they caused in the name of keeping games free from piracy. For example, SecuROM restricted the number of times you could reinstall a game while also forcing occasional online authenticity checks. In actuality, these did very little to actually prevent piracy; instead, even gamers who owned legitimate copies of these games would use a crack or noCD patch to override the DRM.

If some of your old favourites use these DRMs, you can still play them on Windows 10, provided you avoid the DRM. Some developers have re-released DRM-free versions of their games on sites like GOG.com. Of course, you could always download a crack or noCD patch that circumvents the DRM. If you’re not comfortable downloading cracks/patches (considering the malware risk it carries), a legal and relatively safer option would be test-signing the DRM software’s drivers yourself. You can refer to Microsoft’s DIY tutorial (<http://dgit.in/TestSignMSFT>) or use a third-party software to do it with a few clicks (<http://dgit.in/NGOHQ>). This process does leave a Windows watermark, though there are tutorials to help you remove that as well (<http://dgit.in/Compuzo>). 

WHAT'S NEW WITH WINDOWS 10

If we had a dollar for every great new feature in Windows 10, we'd have like 10 dollars.

“**W**indows 1.0 could run applications in windows! That's why it was named 'Windows' and yet a **COOL NEW FEATURE** in Windows 10 was the ability to run Modern UI applications in a window rather than just full screen. Can you believe the absurdity of this?

There is a lot that deserves praise in Windows 10, but the start menu isn't one. Nor is the ability to run applications in a window. Windows has been running apps in windows for three decades and has had a start menu for two.

This isn't to say that interfaces should not evolve, it's just that Windows 8 evolved in the wrong direction. The new Windows 8 apps were kind of an odd bargain for developers. It was a new way for developers to write, package and distribute applications. In essence Microsoft's proposition was: hey why don't you use this new technology that lets you develop applications that are less capable, take up the whole screen, run only on the newest version of Windows, and can be sold only through this one store where we take a

cut of your earnings. Oh and this store only sells these new kinds of apps. The new Universal Windows Applications (UWA) that Windows 10 brings are based on the same Windows RT technology that Windows 8 introduced, however with many of its restrictions removed. On Windows 10 such an app will just blend in, you don't need to know or care whether an app is a new Windows 10 modern app or a traditional classic Win32 app because they only differ in the technology used to create them.

Where Windows 8 apps felt restricted to one version of one OS, and one store and one kind of interface, UWA can run on everything from the Raspberry Pi to the Surface Hub.

Of course all this is great and will encourage new kinds of apps and experiences, but really, what do you get right now when you unwrap your 2500-floppy box set of Windows 10 and install it on your computer device? Let's get right to that.

Window Management

Fun fact, Windows 1.0 could only tile windows, it did not support overlapping windows, but could show multiple windows side-by-side, or one above the other. In other words, it had better window-management support than Windows 8 did for its Modern UI applications. Thankfully Windows 10 makes up for a lot of Windows 8's blunders by making great improvements to window-management, and finally beginning to live up to its name.

In Windows 7 Microsoft introduced a new window management feature, windows snapping. You could move any window to the left or right edge of the screen and the window would maximise to that side of the screen. Move a window to the top-edge of the screen, and it would maximise. Move it to the bottom, and, well... nothing would happen other than the window being inaccessible behind the taskbar, so yeah, don't do that. While Windows 8 didn't add much to this, Windows 10 adds quite a whole lot.

Better Snapping

First of all, in Windows 10 if you move a window to an edge of the screen near a corner, it will take up that quarter of the screen. So for instance if you move a window to the top-left corner of the screen, it will take up a quarter of the screen space in that corner rather than snapping to the left-half like it would previously.

It's also possible to do this with shortcuts. Just like before, [Start + Left] and [Start + Right] will snap windows to the left or right side

of the screen respectively. [Start + up] will maximise an unmaximised or unsnapped window.

What's new now is that after snapping a window to the left or right, you can then snap them to a corner using [Start + up] or [Start + Down]. So to move a window to the top-left corner like in the above example, you would need to first press [Start + left] and then [Start + up].

For those using multiple monitors, you needed to get comfortable with keyboard shortcuts since it wasn't possible to snap a window to right edge of the left monitor, or the left edge of the right monitor. Basically if the mouse could move through the edge and go to another monitor, you could not snap a window there. Windows 10 fixes this by using the speed of mouse movement to decide whether you want to snap a window, or just move it to another monitor. If you move slowly towards the edge, Windows will snap the window to the edge or corner, while if you move the mouse quickly across the screen border, it will just move across.

Smarter Snapping

The window snapping is also a lot smarter now, and doesn't force windows to take exactly half of the screen.

Try this: snap a window to the left side of the screen, and then resize it horizontally so it takes more than its half of the screen. Now when you try to snap a window next to it, it will take up the remaining empty portion



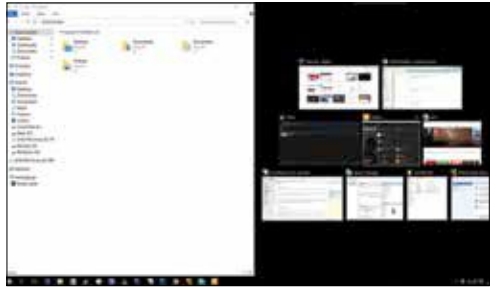
What you'll notice here is that the window on the left is taking more than half the space, and this just works.

of the screen. In previous Windows versions it would still snap to its half, overlapping the existing window.

This works for corner snapping as well, and allows you to better make use of your screen space. This is only made better with the addition of another feature, snap assist.

Snap Assist

Snap assist is a useful new feature that tries to help you rearrange your windows to make best use of your screen space. When you snap a window to the left or right side of the screen, chances are it is so you



Snap Assist in action

can snap another window next to it so you can use them both at once.

This is when snap assist kicks in, and shows you other application windows that you have opened that can be snapped in this space.

This works even if you have one window (or two) snapped to one side of the screen, and another snapped in a corner.

If this isn't enough to organise your windows, you now also have virtual desktops in Windows 10.

Virtual desktops

The idea of virtual desktops has been around for decades. While desktop environments for Linux immediately warmed to the idea, and Mac OS X too added support for virtual desktops, Microsoft has waited till now to include it in Windows.

Third party tools to add virtual desktops to Windows have been around since the Windows 95 era, and even Microsoft created an addon called the 'Virtual Desktop PowerToy' for Windows XP. For later versions there is 'Desktops' which while great, does have some severe limitations.

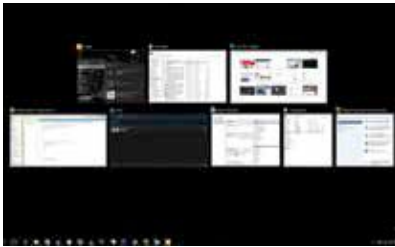
All this talk about Virtual Desktops, and we haven't considered the possibility that the concept itself is new to some readers. So here is what Virtual Desktops are in a nutshell: They are a way to organise the applications running on your computer, such that only one related set of applications are visible at any given time.

A virtual desktop is a collection of related windows, and you can have multiple such virtual desktops for different tasks. For instance, you could have a virtual desktop with work stuff, a browser window with your work email open, Excel, maybe your documents folder. Another virtual desktop could have a game of chess that you dabble in occasionally, and a third one could be one where you have your personal email open in the browser, and your photos folder open to upload some of them to Facebook.

Now, organising windows like this is not something that is mandated by the OS. You could keep all your browser windows in one desktop and all your explorer windows in another. Or whatever organisation scheme tickles your fancy, or none at all if that's what you prefer.

When you are using the “work” virtual desktop, then the only visible windows are the ones in that virtual desktop, while the others continue running invisibly. On the task bar you only see windows from the current desktop, and when you use Alt-tab, only windows from the current virtual desktop show up.

In Windows 10, this is somewhat configurable though. You can have all windows regardless of which desktop they are on show up in Alt-tab and on the taskbar if you want.



The task view makes it easy to get an overview of open windows even if you're only using a single desktop.

All of this is accessed and managed through a new button on the taskbar that toggles the ‘Task View’. You’ll find that Task View quite similar to the Alt-Tab UI except that it stays open till dismissed. It’s also accessible via [Start+Tab].

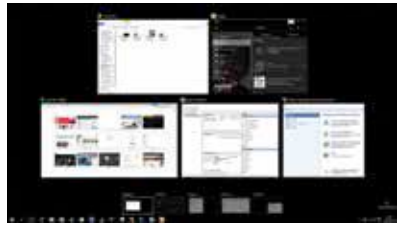
Even if you don’t care for virtual desktops, this view lays out all open windows in a grid,

so you have a better look at all your running applications.

You can switch to a window by clicking it or close it by clicking on the ‘X’ that appears above each window when you hover over it. This is a great way to quickly dock multiple windows without needing to switch to each individually.

In this view you will also see a button called ‘New desktop’ that does what you’d expect. On clicking this button, a new bar with all open desktops will appear below the grid of windows. From here you can switch between different desktops.

Moving windows between desktops as a matter of dragging a window and dropping it on the grid. By hovering over a desktop, you can switch to that desktop and see its windows in the grid without dismissing the Task View. This way you can quickly organise windows between desktops. You can move a window to the 'New desktop' button to move it to a newly created desktop.



Windows virtual desktops are numbered; you cannot name them or save them.

Virtual desktops in Windows 10 are ephemeral, and so is their numbering. There is no fixed set of virtual desktops, you create them dynamically and then discard them when no longer needed.

For this purpose you have new shortcuts:
 Ctrl+Start+D creates a new blank desktop
 Ctrl+Start+Right moves to the next desktop
 Ctrl+Start+Left moves to the previous desktop
 Ctrl+Start+F4 closes the current desktop

There are currently no shortcuts to move windows between desktops.

When you close a virtual desktop, the windows in it are not closed, they just move to the active desktop to their left. This also renumbers the desktops. So if you have 'Desktop 1', 'Desktop 2', and 'Desktop 3' open, and then you close 'Desktop 2', 'Desktop 3' will be renamed to 'Desktop 2'.

Virtual desktops are a powerful feature once you get used to them. Combined with the improved window management features we just discussed they make for a much better experience when handling a large number of open windows.

Continuum

Continuum is where Microsoft has applied a lot of the lessons that it learnt from Windows 8. In Windows 8 there was a hard boundary between tablet mode and desktop mode, and they rarely spoke to each other.

Desktop apps didn't show up when in tablet mode, and tablet apps didn't show up in desktop mode. They both had different ways to switch between tasks, Alt-Tab for the desktop and Start+Tab for the modern UI apps. Of course they fixed a lot in Windows 8.1 but the experience was still jarring.

Windows 10 features a new mode cleverly named 'Tablet mode' that is accessible via a button in the notifications sidebar. Clicking on this button

switches you to this 'Tablet mode' an experience that is optimised for being operated via touch.

When put in tablet mode Windows will automatically make a few changes. First, the currently active window is put to full screen mode. The taskbar will now stop displaying open window icons, and the system tray will only show important icons and remove the rest – although this can be configured.

If you were using multiple desktops, that feature is now disabled, and all your windows are in one desktop. The Task View button is still accessible though, since that is a great touch-friendly way to switch between applications. The start menu, if you click on it in this mode, will now display in full screen rather than as a menu.

If you have two windows snapped next to each other they will remain snapped. You will now see a divider between the windows that can be moved to change the ratio in which the screen is divided. Windows can only be maximised, minimised or snapped to a side of the screen in this mode. There is no support for overlapping windows, or more complex layouts. It's supposed to be used on a touch screen after all.

It does support some gestures for window management. For instance, you can move a window to the left or right edge of the screen



The 'Tablet mode' button is accessible through the notification sidebar.



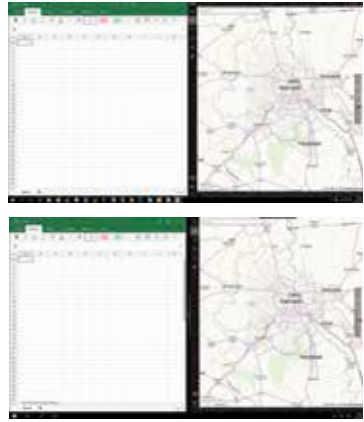
The inbuilt apps work best with Tablet mode since they are UWAs.



The start menu automatically switches to the Windows 8-like fullscreen mode when in tablet mode.

to snap it there, or swipe it down to close it.

Best of all, this feature is not restricted to Modern UI apps, or new Windows 10 apps, it works with all Windows apps! If you are using a Windows 10 application, its titlebar will disappear in this mode, giving preference to the content area, and it might adapt better to the new situation, but traditional apps will remain completely usable. Over time developers can add support for this feature and make adjustment to their UIs to better function in this mode.



Two windows snapped next to each other in Tablet mode

For people using convertibles, or devices with detachable keyboard, such as Microsoft Surface, Windows can detect when the keyboard is removed / attached, or when the device itself switches between laptop and tablet modes and it can notify the user to switch to the more appropriate mode.

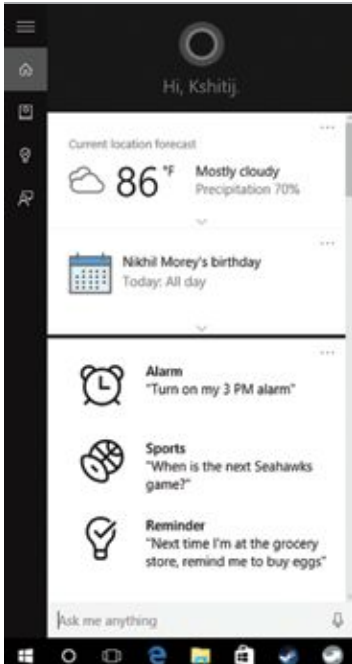
Note that you can play around with Tablet mode even if you don't have a tablet, however if you have multiple monitors this mode might not be accessible, you will need to turn off all but one of your screens to enable this feature.

Behind this smooth switching between different modes is a new technology by Microsoft called Continuum – a name you might have heard before. Continuum adapts the interface of Windows to suit different ways of working. It isn't just limited to adapting between a tablet UI and a desktop UI as we've looked at above.

Microsoft has demonstrated Continuum for mobile phones running Windows 10. Connect such a phone to a large monitor using an HDMI cable, and what you will see on the monitor isn't just a mobile UI displayed on a large screen, but a Windows desktop-like interface. Applications that are Continuum-aware, such as Microsoft's own apps, can adapt their UI to the desktop form factor. For instance, you will be able to run applications in windows, and use the task bar etc.

The idea of an adaptable interface that changes based on the device you use, is something that is being actively worked on in the open source

world as well. The KDE community introduced a netbook-specific UI for their desktop environment many years back and have since then created tablet and mobile editions as well – although the netbook edition is no longer available.



This is what you won't see if you try to use Cortana in India right now.

Likewise, Canonical has also been working on, and has even demonstrated, the ability to power an entire Unity desktop experience from a phone. With the performance gap between laptops, tablets and phones steadily decreasing, this simply seems to be an idea whose time has arrived.

Cortana

Cortana is another centrepiece of the Windows 10 platform. If you've used a Windows Phone device, then you might already be familiar with what that is. If you've used an iOS or Android device, then you might have had the chance to use their built-in voice-activated digital assistants. On Apple devices that's Siri, and on Google devices it is Google Now.

These applications let you ask your phone questions in a somewhat natural way, and get back a spoken

response. For instance, you could say to your iPhone, 'Hey Siri, what is the population of Indore' and it would look up that fact, and speak it out in a natural voice. Similarly, you could ask your Android phone 'OK Google, what time is it in Cincinnati right now' and your phone will give you the answer.

Cortana has already been available on Windows phones for a while, and now it has come to the desktop. That is of course if you live in one of the few countries where it works. India isn't one of them, but Microsoft promises Cortana support in India is coming soon.

Once it's released in India, you'll be able to use Cortana to play music and videos, look up facts, set alarms, take notes, set reminders and a lot

more using your voice. Cortana can be activated by clicking on the new search bar / button in the Windows 10 taskbar, or by simply saying 'Hey Cortana' if you enable that option.

The new Store

Microsoft's app store for Windows has also gone through some major changes for Windows 10. It might not seem special to look at, but there is a lot new that you can expect from it.

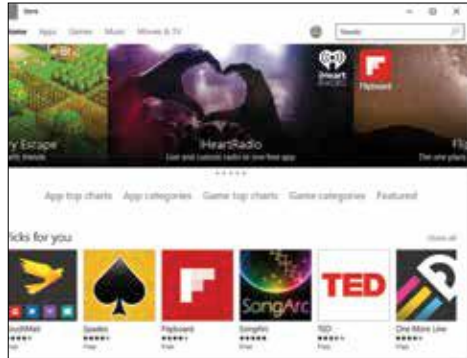
First of all, the store is no longer restricted to only Modern UI / Windows 8 / Windows 10 / Universal Windows Applications, all kinds of

applications will now be available on the store. This doesn't mean that any developer can just drop any old exe file on the store and sell it. Old apps will still need to be repackaged for the Windows Store and optionally developers can even use new Windows 10 technologies and payment models without needing to rewrite the application using a new framework.

If you still prefer traditionally sold applications, here is something that might attract you. Applications installed from the store run in their own sandbox, and as such can't go around creating random files all over your computer, and in your settings folders. Apps installed from the store run in isolation, with their own private Windows registry to mess up, their own private settings and data folders, and restricted access to the rest of the system. This enables you to cleanly install and uninstall apps from the store.

Want to check out a free app but are worried that the app will leave files and settings behind after you uninstall it? Well, apps installed from the store won't have this problem, even if they are traditional applications.

Additionally, the Windows store now also features music, movies and TV purchases, but as you probably expect by now, they are not available in India. At least not right now.



The new Windows store sells music, movies and TV shows as well, although you simply won't see those tabs in India.

Improved Gaming Experience

Microsoft has been trying to win back gamers for a while now, and in Windows 10 they are making an effort to do exactly that.

There are two major new features of Windows 10 that Microsoft is touting to gamers, and they are a new improved Direct X, and a new Xbox app for Windows.

DirectX 12

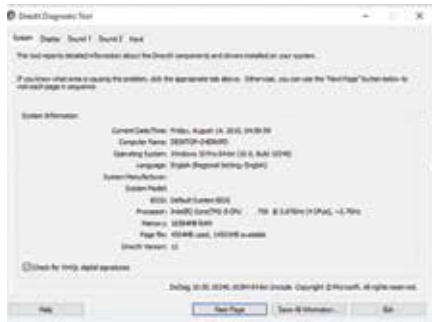
Windows 10 comes with Microsoft's a major upgrade to DirectX. Just like DirectX 10 was exclusive to Vista, and was not available for XP, DirectX 12 is exclusive to Windows 10, and won't be available for previous versions of Windows.

Also like DirectX 10, DirectX 12 brings a big change to the way DirectX works, and can be a huge boon to developers and gamers alike.

First of all DirectX 12 cuts out many of the layers between a running game, and the graphics card it is using. In earlier versions there were many layers of software that came in the way with their own bugs, and inefficiencies.

This often led to situations where a game could perform a lot better, but it was restricted due to the design of the drivers and of DirectX itself. Often there would be bugs in the driver that only popped up on certain hardware and with certain games, leaving developers helpless to fix them.

With DirectX 12 there is a lot more responsibility and power given to developers, as they have closer access to the hardware than ever on a PC. This is the kind of access that allowed developers to create decent looking games on consoles even when PCs had far overpowered them in hardware capability.



At least DxDiag has remained the same since DirectX 1.0

The Xbox App

The Xbox app in Windows 10 is the other new feature that is of interest to gamers. This app brings some of the capabilities of the Xbox to Windows.

While it is the successor to Games for Windows Live, Microsoft claims to have learnt from the mistakes of the almost universally hated software.

The Xbox app as such is merely a social gaming hub that lets you track achievements for games installed through the store, allows you to chat with and message friends, and to share screenshots and video captures of your games.

It can detect the games installed on your computer, and list them in one place. You can launch games from the Xbox app like you would from Steam or Origin, although those will still need to be installed depending on where you got your game.

You can also use the Xbox app shortcuts to take screenshots and make video recordings of your games. Like on the Xbox One, you can configure Xbox on Windows 10 to record gameplay in the background so you can quickly save the last few minutes or even hour of gameplay footage.



You can have the Xbox app record as much as the past 10 mins of gameplay and save it with a single hotkey.



Edge is quick and clean, but that comes at the cost of essential features like addons

The Xbox app can also connect to an Xbox One and can then stream games from the Xbox One to your PC.

For gamers who don't already have apps for capturing game screenshots and videos, this will likely be a great feature. For others, there's nothing special that the Xbox app does that your existing software doesn't.

Edge

Microsoft has taken the opportunity with such a disruptive release as Windows 10 to improve another Microsoft product that has received much criticism over the years: their browser.

Internet Explorer has always been quite innovative despite what its reputation might suggest. It was Internet Explorer that first included what is known as Ajax today, and they had a multi-process design before Chrome was introduced. However, over time its legacy has become a burden, and a clean break was the best idea. Edge is that (somewhat) clean break.

Internet Explorer is still available with Windows 10, but it is tucked away safely only for those who need it. The default browser on Windows 10, is Microsoft Edge. The new browser uses the new EdgeHTML engine, which is essentially their old Internet Explorer engine (Trident) with all the code for legacy support removed. It no longer has support for ActiveX and other proprietary Microsoft technologies and focuses only on the current generation web technologies.

It's a great browser, but by no means perfect, and it's made worse by the fact that upgrading to Windows 10 sets it to your default browser even if you already had another default browser. [Check out our Edge tips and tricks in the main magazine]

A lot more

There is still a lot more that Windows 10 has to offer. It continues in the direction set by Windows 8.1 by making more and more of the Windows experience accessible to touch.

The new control panel for instance adds a lot more configuration options that



The new control panel should be sufficient for most people, but for when it isn't the old one is still around.

were earlier only accessible via the traditional control panel. It isn't perfect though, and there is still a lot that is absent, but it is unlikely that an average user will ever need to visit or know about the old control panel. A great example is how the new modern settings app now lists all installed applications, whether they came from the store, or were installed the traditional way.




The new Start Menu is perfectly fine if you generally use search to launch applications

A new 'Save locations' setting panel now allows you to easily select a secondary drive to store your documents, music, pictures and videos. In the future you will be able to change the drive on which apps are installed as well.

For the security conscious there is Windows Hello, a new technology that adds support for biometric authentication, such as fingerprint, iris, or face-based authentication for Windows.

Of course as usual Windows 10 also updates the set of applications that it comes with including the mail and calendar apps, and of course a new version of Solitaire. Brace yourselves though, because this will be a little hard to believe, but Solitaire, or 'Microsoft Solitaire Collection' as it's called in Windows 10 now displays video ads that you can only get rid of by paying a monthly subscription.

Just head over to the store and you'll find dozens of free versions of solitaire, or those that charge a one-time fee.

Finally, Windows 10 also introduces 'Phone Companion' an app that simplifies interfacing your computer with your phone. It supports Windows phones obviously, but also Android and iOS phones. It's nothing special as it mostly links to Microsoft apps you can install on your phone, but hopefully it will become more capable over time. 

HOW TO GET WINDOWS 10

With its “free upgrade” option for users of Windows 7 and above, Windows 10 looks like it is going to be the dominant operating system for a good while. This chapter will provide you with step-by-step instructions of how you can go about installing this new OS on your current system.

Installing a new operating system can sometimes be a daunting task. For the average user, installing or reinstalling Windows has always been a relatively hassle-free process. However, thanks to its “upgrade for free” nature, Microsoft has changed the rules around the process of installing everyone’s favorite OS. Hopefully, chapter 3 has cleared all your doubts and misconceptions about upgrading, while chapter 4 sure should have you well prepared for the bevy of new features introduced by Windows 10.

NOTE: Before we go ahead, it is important you identify what type of Windows license you own: Original Equipment Manufacturer (OEM) or Retail? If you purchased your system/laptop with Windows preinstalled, then you have what is called an OEM license. However, if you purchased a copy of Windows from Microsoft's online store or a retailer, you have a retail license (costs a bit more than an OEM license). The major point of difference between these two license types is that an OEM license copy of Windows is valid only on the first system (i.e. motherboard) that it is installed. Retail licenses, on the other hand, allow you to reinstall Windows on a new computer without having to worry about activation.

As stated in Chapter 3, the free upgrade to Windows 10 is valid for both OEM and retail licenses. However, if you own an OEM copy of Windows 7/8/8.1, do not try to install Windows 10 on a NEW PC, especially if you are changing the motherboard. After the upgrade, Windows 10 will still have an OEM license which will not be valid for a new system.



It is also possible to buy an OEM copy of Windows for installing on a new PC

So how exactly should I backup my system?

Step 1: Backup your files on another drive

The first files that you prioritize for a backup are personal files like photos and work-related documents stored on your primary system drive, i.e. the drive on which your operating system is installed (generally C: drive). Since a clean reinstall of Windows wipes all files on your primary system drive, you should copy these files over to another drive on your PC (D:, E., etc.). Note that if something goes wrong during your installation process and you cannot boot into your OS, you will not be able to access the files on your backup drive until you successfully reinstall/restore your OS or else physically connect the hard drive to another PC.

The best way to avoid this hassle is to use an external hard drive for the backup. This way, should you botch the installation, you can at least be assured of having easy access to your backup files. Another excellent option for this type of backup is to use a cloud storage service like Dropbox,

Google Photos/Google Drive, or Microsoft OneDrive. This is especially more convenient if you have access to good internet speeds.



Cloud storage services allow you to access your backup from multiple devices

Step 2: Check if you have the installation disk for your original OS

Should anything go wrong during the installation process, you also have the option of reinstalling your original OS. If you purchased a retail copy of Windows, your best option is to use the DVD for the reinstall, just make sure you also have the product key. This can be found on a slip inside the box packaging or on the DVD itself. You can also use a tool like Belarc Advisor or Magical Jelly Bean Keyfinder to extract your Windows product key on the system it is installed in. Further, if you have misplaced your installation disk (or do not have one), you can download a Windows ISO from Microsoft's website (yes, even Windows XP) and burn this on a DVD or USB. (Sidenote: For direct download links for Windows 7 ISOs go here: <http://goo.gl/vG2l8Z>). The steps to reinstall your OS using the bootable DVD/USB are similar to those outlined later in the chapter for doing a clean install of Windows.

Step 3: Create a USB recovery (Optional but recommended)

There's always the possibility that you are not extremely happy with the whole overhauled experience of Window 10 and now want to go back to your old operating system. While you can always reinstall your original OS using the installation disk or bootable DVD/USB outlined in Step 2, Windows 7 and 8.1 users have a more convenient option: creating a recovery disk for your OS on an external drive – either a USB hard drive, DVD or network drive.

To do this, first ensure your destination drive (for the backup) is larger than the space used in the primary drive. The more programs/data you have in your primary drive, the more the time required for the backup and

restore. Hence, if you insist on creating a backup image, it is recommended that you uninstall unnecessary applications and move all media and other file types to another drive before making the backup. You will also need either a Windows installation disk (either DVD or bootable USB) or you can create a system repair disk for which you will need a DVDR and a blank DVD.



In such situations, you'll be glad you made a backup

Steps for creating the system image backup:

- ◆ 1. Go to control panel -> Backup and Restore -> Click on “Create a system image” on the left
- ◆ 2. Now select the drive to which you wish to the backup image – ensure there's enough space and click next
- ◆ 3. Click “Start Backup” to confirm and wait for the process to complete
- ◆ 4. If you do not have the Windows ISO, you have to create a bootable disk using a blank DVD.
- ◆ 5. To create the drive, go to control panel -> Backup and Restore -> Click on “Create a system repair disk” on the left.
- ◆ 6. Select the DVD drive and wait for the tool to burn the bootable repair disk.

To restore from this drive:

- ◆ 1. Ensure the recovery image drive and Windows installation DVD/ bootable USB (or system repair disk) are plugged in and reboot your PC.
- ◆ 2. While it is rebooting, keep hitting the F8 key till you come across the boot menu (this key can vary across motherboard types; check the instruction manual or Google your MoBo model number to confirm).
- ◆ 3. From the boot menu, select the Windows installation DVD/bootable USB (or system repair disk).

If you selected the system repair disk, the system will boot into System Recovery. Select System Image Recovery and follow the steps till your system is restored.

If you used the Windows DVD/USB, it will take you to the Windows setup screen. From here: [Steps outlined are for Windows 8.1. Windows 7 and below will have slightly different screens]

- ◆ 1. Select “Repair your Computer”
- ◆ 2. Click on Troubleshoot
- ◆ 3. Click Advanced Options
- ◆ 4. click on System Image Recovery icon
- ◆ 5. Choose the target operating system (Windows 8.1)
- ◆ 6. After you reach the re-image screen, select a system image (you can select the auto-detected latest image).
- ◆ 7. Unless you changed the partition, there is no need to check the “Format and repartition disks”. Click next.
- ◆ 8. Confirm the re-imaging process by clicking on finish and click “Yes” to the warning that pops up.
- ◆ 9. After the re-imaging is done, you can restart your system and it should be in the exact state it was when you created the image.

So I am done backing up all my data. How do I go about upgrading to/installing Windows 10?

Upgrading from Windows 7/8/8.1

First, it depends on your operating system. The easiest path is if you are running a non-Enterprise edition of Windows 7/8/8.1. In this case, chances are that you have already upgraded to Windows 10 via the reservation system. If you haven’t already, Microsoft is providing an excellent upgrade tool on their website (<http://dgit.in/Win10Download>).

Go to the above link and – depending on your processor type – download either the 32- or 64-bit version of the tool (if you are unsure, check “Control Panel” > “System and Security” > “System” and check System type). Run the tool after it has completed downloading.

The tool will now present you with two options. Option 1 – “Upgrade this PC now” – provides an extremely hassle-free method to upgrade and requires very little intervention from the user. After clicking on this option, Setup will give you three options regarding what data you want kept on your system after the upgrade:

- a) Keep your personal files and apps
- b) Keep your personal files only
- c) Nothing

After selecting your preferred method, all you have to do is click “Next”

is to wait for Windows to download the required files. The download is approximately 4 GB, so ensure you have enough space and bandwidth for the download. After the download is complete, simply follow all the onscreen prompts and your computer should restart, following which Windows will begin installation. Make sure you click “Next” when required, and setup Windows as per your requirements once it boots into the now upgraded OS.

So which of these options is best for me?

Option (a) is ideal if you do not want to be bothered with making any sort of backup. You can also roll back to your original operating system if you’re not happy with the Windows 10 experience. Unfortunately, the convenience of this method does entail a few drawbacks. There’s always the possibility of some compatibility issue rearing its ugly head. Maybe the drivers need to be reinstalled or maybe some corrupt registry entries have broken other programs.

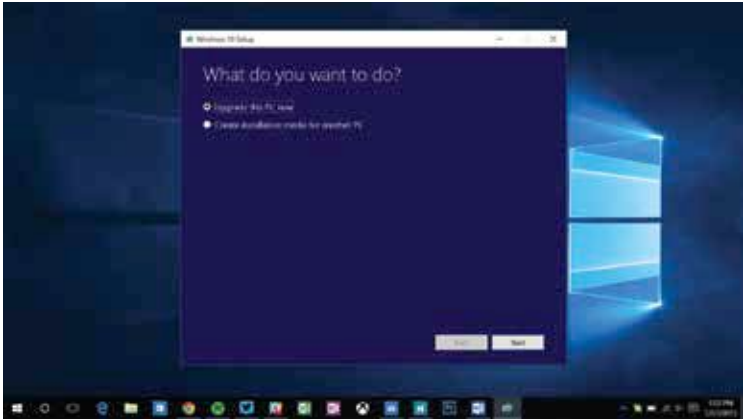
If you want to backup your personal files including photos and videos and do not mind having to reconfigure Windows while also reinstalling programs, then option (b) is the way to go. For those who want to install Windows with a clean slate and with factory settings, Option (c) will help you with just that. It will wipe your system partition clean so you will lose all files and programs stored on it. Just ensure you have all your important files backed up.

Nice. I now have Windows installed. What was the point of that second option?

Performing a clean install of Windows 10

Well, “Create installation media for another PC” in essence allows you to make a bootable disk (DVD or USB stick) which you can use to perform a clean installation of Windows. Most experienced Windows users will tell you that a clean install of Windows (or any operating system) is the best way to purge your system of any and all software-related issues—from broken applications to malware injections. Upgrading the operating system provides a perfect opportunity for a clean install, and it is obvious many users will want to take advantage of installing their new OS on a blank system.

****IMPORTANT:** Note that Microsoft has stated in its support forums (<http://digit.in/1Jo5fjB>) that you must use the “Upgrade this PC now” option if you are upgrading from Windows 7/8/8.1. This is the only way to get your copy of Windows 10 activated. The only way you can use a product key to activate



Make sure you select “Upgrade this PC now” if you are upgrading Windows 7/8/8.1

Windows 10 is if you obtained one purchasing a brand new retail copy. You cannot use your Windows 7/8/8.1 product key during the installation.

Microsoft is handling activation slightly differently for PCs upgraded to Windows 10. Your upgraded copy will be associated with a hardware hash that is unique to your system. So once your system is upgraded, you can reinstall Windows 10 on it without having to worry about the product key as Microsoft has stored you PC’s hardware hash in its database as the owner of a legitimate copy of Windows 10.

This, however, raises a serious problem: **If you are upgrading Windows 7/8/8.1 to Windows 10, you CANNOT reinstall Windows 10 on a new system (i.e., new motherboard) without first installing your original, purchased copy of Windows 7/8/8.1. While this is a tedious process, you have to do it only the first time, after which that PC is registered with Windows 10 for life. The catch is that you can only do this till July 29, 2016. So if you want to install Windows 10 on a new PC after that date, you are out of luck since you cannot upgrade your copy of Windows 7/8/8.1 anymore.

To perform a clean install of Windows 10 from an existing OS, ensure you have a blank DVD or USB stick on which the tool can burn the bootable Windows 10 ISO. Run the media creation tool (as mentioned in the previous section) and select “Create installation media for another PC”. Select the correct language, edition, and architecture of the version of Windows you intend to download. Put in your preferred language and correct architecture and select the SAME edition as the one you are upgrading from (Home or Pro).

In the next screen, select the type of media. Note that if you select ISO, you will need to burn the downloaded ISO on a DVD using a third-party app like PowerISO or Daemon tools. If you select USB stick, just select the correct drive from the next screen and click finish after it's done downloading. The USB stick is ready for booting.

Now, keep the installation media connected to your PC and perform a system reboot. The following are standard steps that you have to follow to perform a clean install of Windows 10 (just as you would any other operating system):

- ◆ 1. Hit F8 as the PC is rebooting to access the boot menu.
- ◆ 2. Select the installation media (DVD or USB stick).
- ◆ 3. You should come across the “enter product key” screen. If you have purchased a retail copy of Windows 10 and this is your first install, enter your product key here. However, if you have upgraded from Windows 8.1, and you do not have a Windows 10 product key, just click “Skip”.
- ◆ 4. Keep hitting “Next” until you reach the screen that asks “Which type of installation do you want?”
- ◆ 5. Select “Custom”
- ◆ 6. At the drive partition screen, partition your drive however you want and go ahead with the install.
- ◆ 7. Note: [If this is your first time installing an OS and you are not familiar with this screen, don't fret. All you have to do is format the system partition (the drive on which Windows 10 was installed) and then select the same partition for the install.]
- ◆ 8. After the installation is complete, your system will reboot into your now clean Windows 10 install.
- ◆ 9. Now follow all the on-screen prompts to initialize your OS and you are good to go.

My mom's PC has Windows Vista. How can I get her the Windows 10 upgrade?

Firstly, you will have to purchase a license. Microsoft is only offering the free upgrade to users of Windows 7 and above. So users with Windows Vista and lower can either purchase a boxed copy of Windows 10 and follow normal installation procedure, or purchase a license from the Microsoft store and use the Windows 10 installation tool with the same procedure as outlined above.

A third, more drawn-out method would be to buy a DVD of Windows 7/8, and use that license for the free upgrade to Windows 10. This is of course

not recommended as you will no longer be able to upgrade Windows after the 29th July, 2016, effectively leaving you stuck with your now worthless copy of Windows 7**.

Keep in mind that if you do decide to upgrade a Windows Vista (or lower) PC to Windows 10, you will have to perform a clean install. Ensure you backup any and all important data before installing.

Doing a clean install looks extremely tedious. Is there an easier alternative?

Yes. Windows 8.1 had introduced two excellent features called Refresh and Reset, which are also available in Windows 10. “Refresh” lets you reinstall Windows while keeping your personal files and settings intact. It also retains any preinstalled apps installed by the manufacturer that came with your PC and apps installed from the Windows Store. “Reset” reinstalls Windows but also wipes all files, settings, and apps, except for any that may have come preinstalled with your system. While neither is a perfect substitute for a clean install, it is a good idea to try either or both of these functions as a last ditch fix.

I like Windows 10, but I would breathe easier if I knew there was a quick way to access my older OS should anything go wrong. Any solution for that?

What you are looking for is a dual-boot system with Windows 10 as one bootable OS and your original OS as the other. This way you can boot into the older OS should you face any issues while running Windows 10. The following instructions should guide you in setting up a dual boot OS system. It goes without saying, backup all your important files before attempting this. Since we will be installing Windows 10 on a partition other than your system partition (the drive on which your original OS is installed), you need not take a backup of the data on it.

First, ensure that you have ample hard disk space to store both operating systems. Each operating system need to be



Example of Dual Boot screen

installed on a different disk partition. Ensure the secondary partition is over 20GB in size (space required for Windows 10). If you have two separate physical hard drives in your computer, you can install Windows 10 on the second drive. Keep in mind that the drive that you choose to install Windows on will have to be formatted.

Alternatively, you can partition your existing system drive to create space for another partition by using Disk Management to reduce the size of an active partition. Do this by first locating your system partition, i.e., the folder your C: partition). Right-click and select “Shrink Volume.” If you have multiple partitions on your hard drive, try resizing a different partition to free up space the required space.

Now follow the exact same steps as outlined in the “reinstall Windows 10” section and create a Windows 10 bootable DVD or flash drive. Now boot into this USB drive and install Windows as you would any normal OS. Just be sure to install Windows 10 on a partition chosen on the basis of the above steps. After the installation is done, you’ll now be able to choose between Windows 10 and your original operating system when you boot your PC. To switch between them, restart your computer and select your desired OS from the boot menu. 

HOW TO GET RID OF WINDOWS 10

Because sometimes you just want things to go back to the way they were before.

As we have already seen so far, Windows 10 has some incredible new elements in the form of Virtual Desktops, Continuum, and so on. However, there are always people for whom it is all a bit too much, and they'd rather stick to the version of Windows they know, love and are familiar with.

If you one of those people who gave Windows 10 an honest try but feel like it has totally fouled up your workflow? Don't stress! Windows 10 improves on its predecessors, but it isn't for everyone. If you picked up the free upgrade and have altered your opinion after running it, this chapter will help you undo your action.

Before you begin

Depending on how you upgraded to Windows 10, whether by using Windows update, or doing an upgrade or clean install from a downloaded

Windows 10 ISO, the procedure to move roll back to the previous Windows version can be different.

If you installed via Windows update or run the upgrade process from an ISO of Windows 10, there is an inbuilt process for rolling back to your previous version of Windows that should be the method of choice.

In some cases, this rollback is not available. If you upgraded from Windows 8 (not 8.1) to Windows 10 using the ISO. Or if you upgraded from XP / Windows Vista using the ISO. Or if you used the ISO to do a clean install. In all these cases you need to back up your important data!

While downgrading Windows these days is mostly a safe operation, as Windows tries to retain as much of your old data as it can, don't take it for granted. Backing up the data is a vital part of the process of downgrading from any Windows version.

Versions of Windows since Windows Vista take the approach of retaining all your old data even if you do a clean reinstall (without formatting of course). It places all your old files in a folder called 'Windows.old'.

Now, don't be misled by the name 'Windows.old', it doesn't refer to the version of Windows. If you have Windows 10 installed and then install Windows 7 on that same drive, the contents of 'Windows.old' will be your Windows 10 install.

You can go inside this 'Windows.old' folder and copy back any important data you have, such as documents, photos, and videos. Even some application settings might be recoverable.

In case you are reverting back to Windows XP, the downgrade process is as good as a format and reinstall; back up everything!

In fact, just back up everything; that is never the wrong advice to give. If you keep data in odd places on your Windows partition, back those up, a Windows reinstall might not be kind to them.

Backup your Windows 10 data

Remember, backups only count if they are on a separate drive or at least partition. Make sure that you create a backup of your data on the external hard drive, USB, or cloud services such as DropBox, Google Drive, Microsoft OneDrive, etc.

The most important thing to know is where your data is stored in the layout Windows uses. In the following examples we assume you installed Windows in C: drive, if not replace 'C:' with whatever drive letter Windows is using for your install.

All user-centric files such as documents, photos, music, videos, etc. are stored under 'C:\Users\' which should have a separate folder for each user account on your computer. Note that it isn't compulsory to save all your files here, if you have also saved files elsewhere you will have to back those up as well.

Let's assume that as a cruel joke, your parents named you 'User Name' and that's what your login id is on Windows. You will find your data under: 'C:\Users\User Name\'

Inside that folder most folder names should be self-explanatory, they have names like Pictures, Downloads, Desktop, Documents etc. Some other applications might have created their own folders here, if you want to be safe back those up as well.

There is however a hidden folder here called 'AppData' that could also have some data of importance. This folder contains application data for installed applications, such as your Browser profiles, game save files, and other settings and configuration files. If you want to save these files, you will have to dig into this folder.

Within 'AppData' you will find two or three folders, 'Local' and 'Roaming' should definitely be there. Here applications are supposed to use the 'Local' folder to store data that can be regenerated, such as your browser cache and other less important data. Back up the 'Roaming' folder for your profiles at least. If not all of it, then at least the applications that you think are important.

Just to clarify this folder is at 'C:\Users\User Name\AppData'. You can enter that path in the location bar to get to this folder since it is hidden, or just enable display of hidden files.

All of the above info can also be useful if you want to get existing data out of an existing 'Windows.old' folder. Your files there will be in 'C:\Windows.old\Users\User Name\'.

Rolling back to earlier Windows

Remember that 'Windows.old' folder we mentioned earlier? This is where it gets really important. If you upgraded to Windows 10 from a previous version, this folder will be around for 30 days. And if it's around chances are you can simply perform a rollback.

Open the new Settings app by clicking on 'Settings' on the start menu, or searching for settings using the new search bar in Windows 10. Click the "Update & security" icon and select the "Recovery" option. In case your operating system is eligible to move back to older versions of Windows,

you ought to pick an option that says 'Go back to Windows 8.1' or 'Go back to Windows 7', depending upon the operating system you upgraded to Windows 10 from.

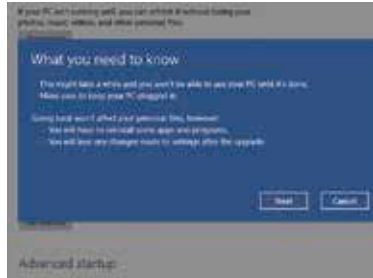
During the rollback process, Windows 10 screen will then request your feedback and the reason to move back to the older operating system. Give the feedback you want or don't. Remember 'I dislike the new start menu' is better and more useful than 'Windows 10 sucks'. Click on Next.

If you're using a laptop, ensure that it is plugged in to avoid any interruption in the rollback process due to power off. Click on the Go back to Windows 8.1(or Windows 7) button.

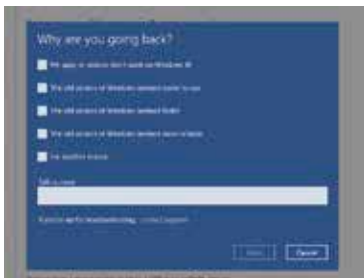
Now comes the most important part of the process. You will be required to input your password in order to sign in to an older Windows. The password must be same as earlier. The process execution will then take a while and bring your past Windows back on your computer/laptop without leaving changes to any of your existing files or documents. Remember, you have 30 days to do this, after which the 'Windows.old' folder will be removed.



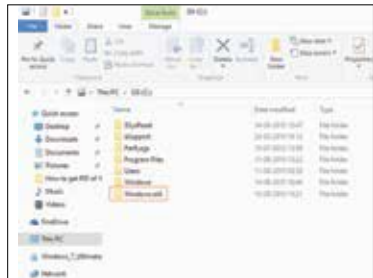
Go back to Windows



What you need to know



Why are you going back



Windows.old

If rollback isn't possible

If you ran disk cleanup after installing Windows 10 and asked it to clean up your previous Windows installation, or if you otherwise manually deleted 'Windows.old' – which isn't a matter of right-click an 'delete' by the way. Then you won't see the roll back option. You will also not see it in a few other cases, as we mentioned before.

If this is the case, don't worry, you can still get back to your previous version of Windows. All you need are the setup files of the version of Windows you want to roll back to. You might have received these on a setup disk with your device, or your Windows purchase. If you no longer have them, you can also download ISO files for recent versions of Windows from: <http://dgit.in/WinRecover>.

You will need to provide the product key if you are trying to download a Windows 7 ISO. In case of Windows 8.1 you will be able to download a tool that downloads the setup files for Windows 8.1. You might need the product key for Windows 8.1 as well if it asks for it. In some recent laptops this key is stored in your hardware, so you won't need to enter it at all.

You can burn this image file to a disc image or simply copy it to a bootable USB drive using Windows USB/DVD Download Tool: <http://dgit.in/WinUsbTool>. Or, best of all you can simply mount the ISO file by double-clicking it and install it from there.

If you are installing from a pendrive or optical disk, you might need to use the 'Advanced Startup' feature of Windows. Go to Settings > Update & security > Recovery; there click on "Advanced startup." This option allows you to start up from a USB drive or DVD. You can also make changes to your computer's firmware settings, Windows startup settings, or restore Windows from a system image. Executing this option will automatically restart your computer.

On reboot you will see four options to choose from. Choose the one that says "Use a device" and then select the device with your Windows setup files. After that the installation process for your older version of Windows should start.



Choose an option

Understanding downgrade rights for purchasers

If you already have Windows 10 installed on your brand new hardware, and are wondering how to go back to an older, more-familiar version of Windows. There is still a way out.

If you buy Windows as part of your device, often you can avail of your downgrade rights. These allow you to opt for an older version of Windows


Client operating systems	Latest update or service pack	End of mainstream support	End of extended support
Windows XP	Service Pack 3	April 14, 2009	April 8, 2014
Windows Vista	Service Pack 2	April 10, 2012	April 11, 2017
Windows 7 *	Service Pack 1	January 13, 2015	January 14, 2020
Windows 8	Windows 8.1	January 9, 2018	January 10, 2023
Windows 10, released in July 2015 **	N/A	October 13, 2020	October 14, 2025

Windows lifecycle

in lieu of the one you get with the device. This offer is available for the previous two supported versions of Windows. So for Windows 10 devices, you can move back to Windows 8.1 or Windows 7.

This is harder than it need to be. You first need to install the previous version of Windows on your computer. For this you need the setup files of that previous version of Windows, and a product key. You can take this from a friend, or use a key you already have installed on another computer, or other less savoury sources. You can run the setup as normal using these files and the key.

Once Windows is installed activation will fail because you used a key that is already in use on another computer. At this point you will have to use manual phone activation, and tell them that you are exercising your downgrade rights, and they should help you with the activation.

Since you got Windows 10 with your computer in this case, you can easily upgrade to Windows 10 again later without needing to pay for an upgrade. Think of it this way, getting Windows 10 on a new computer entitles you to run Windows 7, Windows 8.1 or Windows 10 on that computer as long as you only run one at a time. 

COMPARING EDITIONS

Home or Pro, a question that has been asked for centuries; we finally give an answer.

Thanks to the expanding ecosystem around Windows 10 devices, there are now more editions of Windows than ever before. However, this isn't like the confusing situation with Windows Vista and Windows 7 editions which were available to consumers in 5 editions: Starter, Home Basic, Home Premium, Professional, and Ultimate.

Of course there was also an Enterprise edition and other more esoteric editions for special purposes. Windows 8 simplified this to Home, and Pro, and Windows 10 sticks with that.

For consumers buying a device, or buying a retail box of Windows 10, or buying a copy online, the only editions you need to worry about are Home and Pro.

Still, for the sake of completeness, let's have a brief look at all the editions of Windows 10 before focusing on those two.

The many editions of Windows 10

There are seven editions of Windows 10 as of now, and there are plans for more as the devices that need them come out.

Windows 7

From Edition	To Edition
Windows 7 Starter	Windows 10 Home
Windows 7 Home Basic	
Windows 7 Home Premium	
Windows 7 Professional	Windows 10 Pro
Windows 7 Ultimate	

Windows 8

From Edition	To Edition
Windows Phone 8.15	Windows 10 Mobile
Windows 8.16	Windows 10 Home
Windows 8.1 Pro	Windows 10 Pro
Windows 8.1 Pro for Students	

If you're wondering which version of Windows 10 you are eligible to get as an upgrade, let this table be your guide.

Windows 10 Home: This is the edition of Windows 10 that will be sufficient for a majority of users. It includes all the features we have talked about till now, like Cortana, Continuum, Virtual Desktops and the biometric security features of Windows Hello.

Windows 10 Pro: Windows 10 Pro is better suited for computers running within a company, it includes features for better protection of data, remote management and control, group policy, etc.

Windows 10 Enterprise: This edition adds features of interest to companies who want to control the experience of their employees' devices. It also allows installation to a portable device like a pendrive, or external HDD. Enterprise users can utilise the Long Term Servicing Branch of Windows 10 that will keep receiving security updates without needing to upgrade.

Windows 10 Education: This edition of Windows is mostly the same as

the Enterprise edition, except that in this case the device is in control of an educational institution instead of a company.

Windows 10 IoT: This is a mostly new edition of Windows designed to be run on device like the Raspberry Pi 2. Think of any Windows 10 feature, now ask us if it's there on Windows 10 IoT. The answer is probably no! This edition comes without a desktop or any UI shell of any kind, not even a command line shell. You are meant to write apps for this device and directly deploy them to it. It is freely available to download for use on such devices.

Windows 10 Mobile: What with Windows 10 now sharing its core across all kinds of devices, Windows 10 Mobile is just another such edition. This edition ships with a touch-friendly edition of Office. It also supports Continuum, so you can plug your phone to a larger screen and use it like a desktop.

Windows 10 Mobile Enterprise: For enterprises handing out phones to employees, this edition will allow them some control over their employees' devices, such as control over updates, installed apps, etc.

Other than this there will also be a Windows 10 Holographic edition for Microsoft's new HoloLens. Microsoft claims that this new edition of Windows will be available to other manufacturers building similar holographic displays as an alternative to the Microsoft HoloLens.

To Pro or not to Pro

For desktop users not interested in complex volume license agreements with Microsoft, who just want to pick up a copy of Windows to install on their computer, it all boils down to two editions of Windows, Home and Pro.

If you already have Pro, there is no mechanism in place for a downgrade to Home, you would need to buy a new copy of Windows 10 Home and then do a clean install. Just stick with Pro. For those who want to understand what advantages Pro brings, and why it might be worth it (or not) to you to buy or upgrade to, read on.

Often times part of the differentiation between editions of Windows has been artificial restrictions placed on cheaper editions. For instance Home Basic versions of Windows 7 were restricted to 8GB of RAM and did not have support for Windows Aero. They also could not create homegroups,

only join them. These artificial restrictions didn't save Microsoft money, in fact they probably cost them money to implement.

Microsoft did good in removing most of such artificial restrictions in Windows 8 – well home versions were still restricted to 128GB RAM vs 512GB for Pro, but we'll let that pass. This hasn't changed with Windows 10, the Home edition has a decent feature set, and no arbitrary restrictions.

Where the major differences that lie between Home and Pro are the set of features supported by each OS. Here Pro builds on Home, in that there is no feature you will find in Home that isn't also available in Pro. Unless of course you consider fewer features / bloat a feature in which case your decision is made for you.

With that said, let's look at what these features are that you get with Pro.

Bitlocker

Using a password in a Windows user account is comparable to gently latching a door. It signals to others that you don't want them snooping around but relies on their own sense of decency to be effective.

Maybe you share a room with people with no respect for privacy, shameless thugs, and hooligans – or 'friends' as most people call them. Maybe your data is just that important. The password on your user account isn't enough.

Bitlocker can encrypt your partitions such that they will only open if you use the correct password. It can even be used to protect the drive in which you have Windows installed, in which case your computer needs to have a TPM (Trusted Platform Module) or needs to be specially set up to accept a password at boot.



You can also encrypt pendrives with Bitlocker, which might make them unusable on other OSes, or older versions of Windows.

Bitlocker encrypts the data on disk, so even if someone rips out your hard drive and uses Linux or some other OS or tool that bypasses Windows permissions, all they will get is encrypted data that is useless without a key.

Hyper-V

If you tend to play around with virtual machines a lot, you'll probably find Hyper-V quite useful. It is Microsoft's software for running virtual machines, and supports not only Windows but also Linux guests.

You can always install VirtualBox or VMWare Player on Windows 10 Home, and for many people that might be the better and cheaper option. However, Hyper-V is more comparable to professional virtualization solutions like VMware Workstation. It has some advanced features that you will find lacking in the free alternatives.

Unfortunately, Hyper-V cannot coexist with VMWare Player / Workstation or Oracle VirtualBox, so if you need to use any of those you can't use Hyper-V.



If you tend to emulate Windows on a virtual machine, Hyper-V will probably be a better option than VMWare Player or Oracle VirtualBox.

Current branch for business

As we explained before, Windows 10 now has multiple branches or tracks or channels for delivering updates. The fastest update track is if you opt into Microsoft's Insider track which gives you beta builds, and then choose the 'Fast' option. Slower than that is the 'Slow' option of the Insider track.

What most people will be using, and what Home users will be forced to use is the Current Branch. This will be updated with new builds every few months, requiring Home users to upgrade.

Pro users can delay upgrades and move to what Microsoft calls the 'Current Branch for Business'. This doesn't delay upgrades forever, but simply delays upgrades till – in Microsoft's own words – 'their quality and application compatibility has been assessed in the consumer market'. In other words, after Home users have served as involuntary testers for Microsoft's new builds.

Depending on how you see things, this might come under the category of arbitrary restrictions based on the Windows edition.

Assigned access


Assigned access is simple way of creating a locked down account for people to use. It lets you simply pick a user account, and restrict them to a single app that they are allowed to use.

If you just want some people to be able to log into your computer to use a single app, you can use this to do that. Unfortunately, you can only set this up for a single account, and for a single app. The selection of apps too is restrictive.

For instance, you cannot create an account that only has access to the Edge browser though that would make a lot of sense. Since this is a feature designed for companies it doesn't really benefit home users even in ways it could. It's mostly designed to allow companies to create a custom kiosk interface that restricts a computer to only that app.

There are a number of other features that you get with Windows 10 Pro, such as the Group Policy manager which lets you tweak the kind of settings you'd usually need registry hacks for, the ability to join a domain or Azure Active Directory, Remote Desktop support and a few other things here and there.

That's all great, but you might be wondering what exactly these editions of Windows 10 are going to cost you. While Windows 10 Home costs ₹ 7,999, Windows 10 Pro costs nearly double as much at ₹ 14,999. Upgrading from Home to Pro will cost you ₹ 7,500.

So it's slightly more expensive to buy Home and upgrade to Pro than it is to just buy Pro to begin with. However, the price difference is minor enough that if you're considering purchasing Windows 10, it might be a better idea to but Home right now. If Home suits your needs, and you don't think anything is missing, then you've just saved ₹ 7,000, while if you really do feel the need to upgrade after a while, all you've lost is a ₹ 500. 



This poor user can only ever check the weather.

WINDOWS 10 TIPS ‘N TRICKS

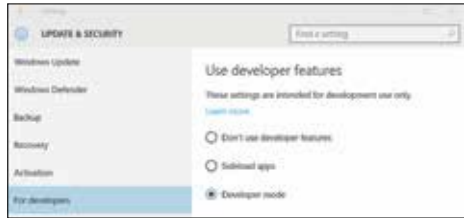
To tinker or not to tinker, that is
the question!

With the availability of free upgrades to the OS, Windows 10 is all set to become the One OS to rule them all. Once you've got your free upgrade, you're going to want to explore Windows 10 and find some fun things to do, or it would not be different from using any other old operating system. In this chapter we show you how to accomplish a variety of tasks, some that may not seem obviously possible and others that are downright necessary! There is no particular order or preference, so make note of what you think you want to try and try it for yourself. This list is by no means exhaustive, but merely the tip of the iceberg. It goes without saying you need to proceed with caution. Have a restore point ready should something go wrong. What are you waiting for, dive right in!

Sideload Applications

“Sideload” refers to installing applications that have not been certified by Windows Store. As a rough analogy it is like installing black-market .apk files on an Android device. The difference is that you need to install a certificate on your device along with .appx file (the installation package of the application). This is because all Universal Windows apps have digital sig-

natures that are verified against the certificates installed on your device to determine if they are 'trusted' or not. Thus if you are developing your own application and want to test it, or if you want to install an app from some source other than the Windows store, you have to sideload the .appx file and its certificate using Developer Mode.



Sideload apps and debug them too!

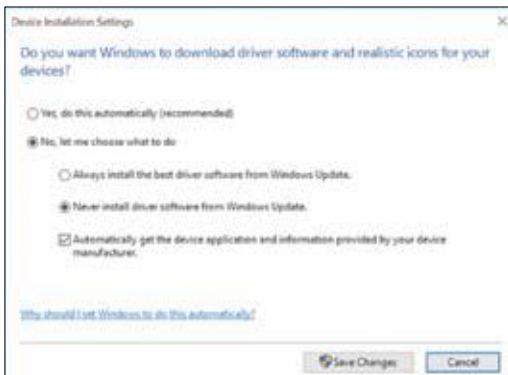
To enable Developer Mode open Settings (Windows key + I, remember it, you will use it a lot!) > Update and Security > For developers. Select the radio button next to Developer mode and click Yes in the subsequent pop-up window in which you can confirm.

Uninstall unwanted drivers

If a device driver is buggy or if Windows update installed its own drivers over your custom installed drivers, you can uninstall the particular driver from Device Manager. Right click on the Start button and select Device Manager. Locate the corresponding device and right click > Uninstall. Check the box that says "Delete the driver software for this device." and click OK.

Block Windows device driver updates

Even if you uninstall a device driver, Windows will automatically install



When generic drivers are not your taste

it the next time you update. To change this behaviour, right click on the Start button and select System > "Advanced system settings", on the left. Under the Hardware tab, click on "Device Installation Settings" and change the selection to "No, let me

choose what to do”. This reveals another selection which you can change to “Never install driver software from Windows Update.”

Uninstall unwanted updates

At times an update may cause issues on a device, or you may want to uninstall an update for some other reason. In that case right click on the Start button, select Control Panel > Programs > Programs and Features > View installed updates. Right click on the unwanted update, select Uninstall and then click Yes on the subsequent confirmation dialog.

Hide/Show an update

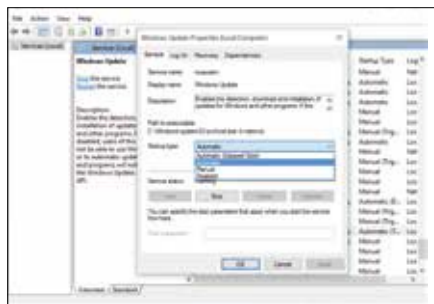
Even if you uninstall an update using the previous method, Windows update will automatically download it the next time. In order to prevent this, Microsoft provides a downloadable tool to Hide or Show a selected Windows update. Once you have followed the instructions in the previous step (and made a note of the update number - KBxxxxxxx), download the troubleshooter from <http://digit.in/TrblesbootWin10>. Open the downloaded file, click Next and follow the instructions to Hide/Show the troublesome update.

Disable Automatic App Updates - Pro Only

Microsoft has made updates mandatory for Windows 10 Home users, and that even applies for updates to apps downloaded from the Windows Store. Windows 10 Pro users have some leeway though. Open the Windows Store, click on your profile picture on the top right and select Settings. Set the toggle under App Updates to off.

Block Windows Update

Since Windows Update is a service, it is possible to disable it altogether. Although, doing this means that you will have to enable it and check for updates every time you want to update your PC. Right click the Start button and select Control Panel >



Disable Windows Update

System and Security > Administrative Tools > Services. Scroll down to Windows Update, right click and select Properties. Change the Startup type to Disabled and click OK. Finally, Stop the service and you should not see “Running” next to it under the Status column.

Enable God Mode Folder

The God Mode folder is an easy place to access shortcuts to many administrative tasks and tools for Windows 10. It can be made at any location by creating a new folder and renaming it to “GodMode.{ED7BA470-8E54-465E-825C-99712043E01C}” without the quotes. You can also replace “GodMode” part of the string with any name of your choice for the resulting folder.

Disable/Enable Windows Defender

Open the Registry Editor by pressing Windows key + R, typing regedit and pressing Enter. Select Yes on the subsequent UAC pop-up. Navigate to HKEY_LOCAL_MACHINE > SOFTWARE > Policies > Microsoft > Windows Defender. Right click in the panel on the right and select New > DWORD (32-bit) Value. Change the Name to “DisableAntiSpyware” (without quotes) and double-click on it, set Value data to 1 and click OK. You have successfully disabled Windows Defender. Re-enabling it is as simple as setting the Value data back to 0 and clicking OK. Note: Some anti-virus programs automatically disable Windows Defender during installation.

Disable Wi-Fi Sense

Wi-Fi Sense is a smart feature that automatically shares details (read: passwords) of Wi-Fi networks that you have logged in to with your Microsoft contacts. Though they don't display the passwords, they share access nonetheless. Consequently it also may get shared with friends of your friends, and before you know it your whole neighbourhood may be hogging on your bandwidth as they pass by your house within range of your network. Clearly Microsoft didn't consider this a bad thing and so it may be enabled by default. To change that, head to Settings > Network & Internet > Wi-Fi > Manage Wi-Fi Settings, and basically disable and/or deselect every option that is on the page.

Protect your Wi-Fi network from Wi-Fi Sense

The previous tip doesn't solve the problem if say, Wi-Fi Sense sharing is enabled on a friend's phone who has (legitimate) access to your network.

There is a simpler, more general (and uglier) solution that involves having to change your router's SSID - Open the router's settings page and add "_optout" to the end of the name of your network. This way access to your network will not be shared without manually entering the password.

Change the default download location of the Edge browser

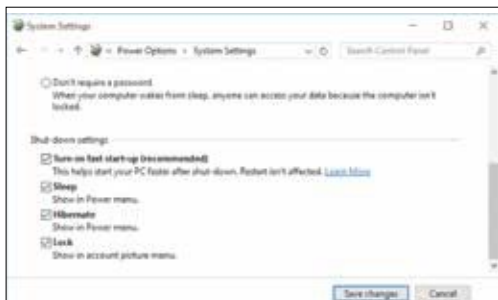
Open the File Explorer, right click on the Downloads folder and select Properties. Under the location tab, change the value to your desired location and click OK. Note: This method changes the Download folder for all applications that use the default Windows system Download folder. Equivalently, you could do this from the registry editor by navigating to HKEY_CURRENT_USER > Software > Microsoft > Windows > CurrentVersion > Explorer > User Shell Folders, and changing the value that reads %USERPROFILE%\Downloads to the desired location.

Boot to Advanced Startup Options

Advanced Startup Options is a useful boot option that allows you to access Windows Recovery, boot from another drive (DVD or USB) or restore Windows from a recovery image. To access it go to Settings > Update & Security > Recovery and select Restart now under Advanced startup. Alternatively, hold the Shift key while selecting Restart from the Power menu. If you access it often, you can create a shortcut by right-clicking in the location of your choice and selecting New > Shortcut, and then giving it the location %windir%\system32\shutdown.exe /r /o /f /t 00 and any name of your choice.

Enable Hibernate option

Hibernate is a power option that shuts down your computer but saves the current state. It's not present in the power options by default. To enable it, press Windows key + X, select Command Prompt (Admin), and click on Yes when the



Add the option to Hibernate

UAC prompt shows up. Type in “powercfg/h on” (without quotes) and hit Enter. Then head to Settings > System > Power & sleep > Additional power settings, or press Windows key + X and select Power Options. On the left, select ‘Choose what the power button does’, and then click on ‘Change settings that are currently unavailable’. Finally, under Shut-down settings, check the box next to Hibernate, and Save Changes. Note: While you’re at it, you can even turn on fast start-up from the same place.

Disable Aero Shake (Pro only)

Aero Shake minimizes all background windows by shaking the title bar of the window that you want to leave open. If you do not use this feature, you can disable it to prevent randomly minimizing your windows while repositioning one of them. Open the Run dialog by pressing Windows key + R, type in gpedit.msc and hit Enter. Click Yes on the UAC pop-up and you will have the group policy editor in front of you (which is not available in Windows 10 Home). In the left pane, expand User Configuration > Administrative Templates > Desktop. Then in the right pane scroll down and double-click/tap on ‘Turn off Aero Shake window minimizing mouse gesture’. Select the radio button next to Enabled to disable Aero Shake, and vice versa.

Rename your PC

While it is perfectly possible to make do with the default name, a custom name can be assigned at Settings > System > About > Rename PC. You can assign any alphanumeric name, but not purely numeric, and you cannot use any special characters except hyphen(-).

Create a Password Reset Disk

If you’re in the habit of forgetting your passwords, this is just the thing for you! Open the Control Panel by right-clicking the Start button and search for “password reset disk”. From the results, select ‘Create a password reset disk’. Insert your USB drive (which you want to use as the password reset disk) and proceed with the Wizard.

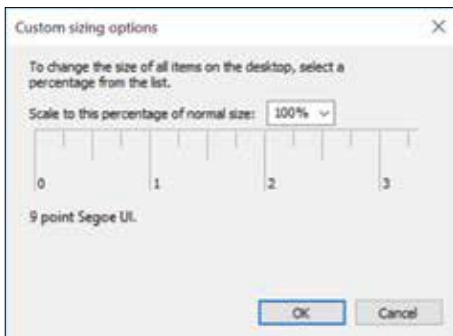
Automatic Sign-In

Windows 10 has an annoying sign-in that forces the lay user to enter a password or a PIN on every boot. To bypass this, open the Run dialog (Windows key + R), type netplwiz and press Enter. Select the account you want to sign in automatically and uncheck the box on the top next to ‘Users

must enter a username and password to use this computer.’ After you click OK you will be prompted to enter the password twice. Make sure that the passwords you enter match the password of the account that you are using to sign in automatically.

Make the most of Task View

Pressing the Windows + Tab keys, or clicking the button with rectangles on the Taskbar opens up Task View, which is a new virtual desktop feature in Windows 10 that Ubuntu users may find familiar. It is very useful for boosting productivity on multiple screens. You can click on ‘Add a new desktop’ after opening Task View, or use the keyboard shortcut Windows key + Ctrl + D to switch to a new desktop. Switching between already open desktops is accomplished by Windows key + Ctrl + Left/Right. Getting rid of the current Desktop is accomplished by Windows key + Ctrl + F4.



Increase the DPI on your screen

Change DPI scaling

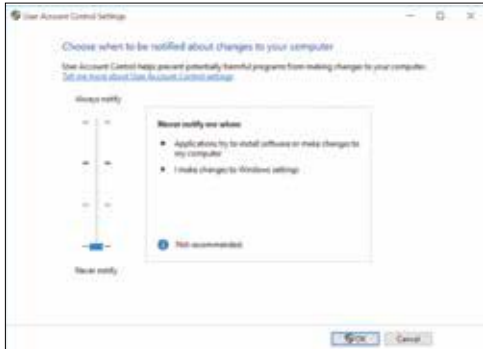
DPI refers to the Dots Per Inch, or the pixel resolution that the operating system renders onto the screen. There are times you might want to change that (for example, to take high resolution screenshots of a small area of a screen) and if now is such a time, open the Control Panel, put it in the Icon

view and select Display. Under ‘Change the size of items’ click on the link that says “set a custom scaling level”. In the Custom sizing options dialog that shows up, you can select the scaling of your choice from the drop-down menu. Click OK and Accept the changes. You may have to log out and log in again to see the actual effect of the re-scaling.

Disable UAC

Do not take this as a suggestion, UAC is there to protect you. However, when you know what you’re doing and need to work fast, there is nothing more annoying than the incessant confirmations. To save yourself from the digital

nagging, open the Control Panel in icon view, click on User Accounts and then click on the 'Change User Account Control settings' link. Drag the slider all the way to the bottom to 'Never notify' and click OK, but UAC will still bug you one last time. Alternatively, the geekier way to do this



An end to the nagging

is from the registry. Open regedit and confirm your second-last UAC dialog. Head to HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Policies > System. In the right pane, change the value of EnableLUA to 0. After that, restart your system for the changes to take effect.

Inking on the Edge

Microsoft's latest browser has some nifty new features, like the ability to 'Ink' onto a webpage and then share it, à la Samsung's much touted S Pen's



Inking on the Edge

capabilities with the S Note. In Edge, browse to the website that you want to 'ink', and click the pen and paper icon in the upper right corner. That results in a snapshot of the page within the browser that can be overlaid with the user's markings. The toolbar is replaced by five buttons that are (from left to right) the Pen, Highlighter, Eraser, Typed Note (text box) and Clip tool. Additionally, on the right there are the Save, Share and Exit buttons, for use once you are done 'inking'.

Disable AutoRun

The AutoRun feature refers to the actions taken automatically by the operating system when a storage media is mounted. The instructions that determine the invoked actions are stored in the autorun.inf file in the root folder of the storage device. Disabling AutoRun can have security benefits, but is otherwise recommended only to those who know why they are doing what they are doing. It can be achieved by adding a Key to the Windows Registry in the appropriate place with the right value. Head to HKEY_CURRENT_USER > SOFTWARE > Microsoft > Windows > CurrentVersion > Policies and add a new Key named "Explorer" (without quotes) if it doesn't already exist. To this key, add a new DWORD Value and name it "NoDriveTypeAutorun" (again, without the quotes). Set its value according to the following table:

1	drives of unknown type
4	removable drives
8	fixed drives
10	network drives
20	CD-ROM drives
40	RAM disks
80	drives of unknown type
FF	all kinds of drives

Disable Autorun on specific type of drives

To disable AutoRun for multiple drives from this list, just add the corresponding values and set that as the value for the DWORD. (Eg- To disable AutoRun for removable and network drives, set the value to 14.) Exit and restart your PC.

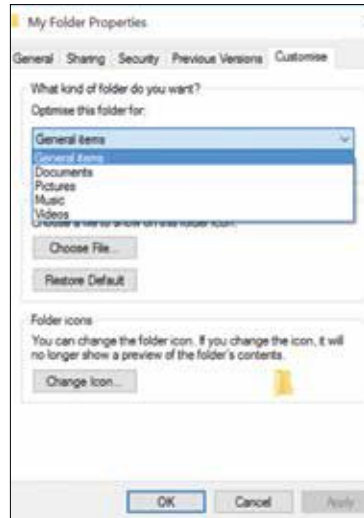
Set Folder Templates

Folder templates are an easy way to organize and optimize the view of folders according to their content.

Right click on a blank space in the folder you want to customize and select 'Customize this folder...'. Navigate to the Customize tab and accordingly select the type of optimization from the drop down menu. You can check the box just under to automatically apply the same customization to all subfolders of that folder as well.

Add a Display language

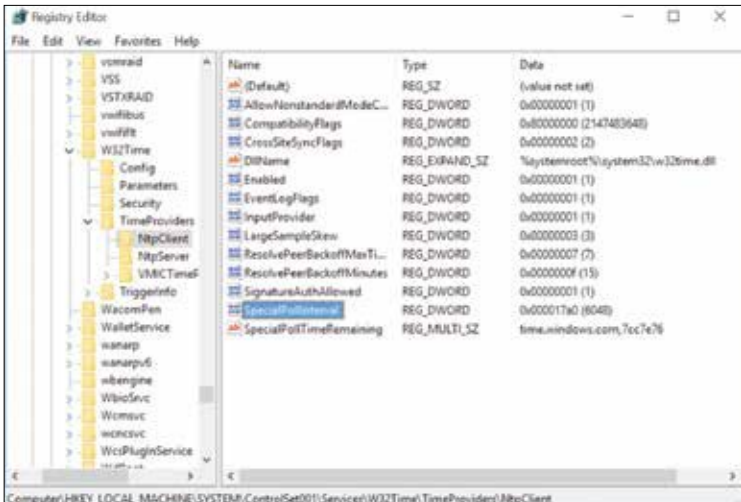
In an extremely multi-lingual developing nation like ours, having a native language display on the operating system can ease the transition to technology and open new doors for many people who would otherwise be daunted by it. To add a new display language, go to Settings > Time & language > Region & language > Add a language. Select the language you want and it will be displayed under 'Languages'. Click on the newly installed language, then Options and finally click on the Download button to download the complete language pack.



Customize your folder

Change the Time Sync Interval

By default Windows 10 synchronizes its time with the time servers at a frequency of once a week. If you want to change said frequency for any reason,



Reset the time update interval from the Registry

(say, being too lazy to change the dead button cell in your motherboard) a visit to the registry is required. Open the Windows Registry Editor and go to HKEY_LOCAL_MACHINE > SYSTEM > ControlSet001 > services > W32Time > TimeProviders > NtpClient. On the right-hand pane, double-click 'SpecialPollInterval', and then click on the radio button next to 'Decimal'. Enter the value you want (in seconds) and click OK to save your changes.

Delete the old Windows.old folder

On upgrading to Windows 10, a backup of the files of the previous operating system is stored in the folder Windows.old. If you liked the upgrade and have no intention of rolling back to your old operating system, there is no reason for wasting space by keeping that folder. Open the Run dialog with Windows key + R, type "cleanmgr" (without quotes) and hit Enter to open the Disk Cleanup utility. Select the drive with your active installation of Windows and press OK to proceed. Next, click on 'Clean up system files' and once again select the same drive. Once the program has completed its scan and calculations, check the box next to 'Previous Windows installation(s)' and click OK. You will get another confirmation about permanently deleting the files after which, mission accomplished.

Rollback using the Windows.old folder

On upgrading to Windows 10 via the automatic upgrade, if you don't like what you see and want to get back your previous installation of Windows instead, there is a very convenient button to do so. It is located under Settings > Update & security > Recovery > Go back to Windows version, according to the version of Windows you upgraded from. Click on 'Get started' and proceed with the wizard, ignoring Microsoft's futile attempts at making you stay with Windows 10. Although, once you have your old Windows OS back, you will have to install your apps and software once again.

Customize Color and Appearance

Windows 10 has interesting new personalization tweaks like automatically choosing accent colors for your taskbar and windows from your background. Go to Settings > Personalization > Colors and toggle 'Show color on Start, taskbar and action centre' to On. Optionally, you can toggle the automatic accent picking feature under 'Automatically pick an accent color from my background'. If you are more artistically inclined or just like having complete control over colors like when on acid, you can create a shortcut to the

Color and Appearance part of the old Control Panel. Create a new shortcut and enter its location as “rundll32.exe shhell32.dll,Control_RunDLL desk.cpl,Advanced,@Advanced” (without the quotes), click next and give it a name of your choice. Further, you can right-click the shortcut, and click on ‘Change Icon’ under the Shortcut tab to give it a custom icon of your choice.

Go back to the old tray Clock and Calendar

The New Tray Clock and Calendar in Windows 10 has a larger font and design that is optimized for touch but if you like having or need to have multiple clocks showing different time zones, you can go back to the Old Tray Clock and Calendar. Open the Registry Editor and head to HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > ImmersiveShell. Create a new DWORD value and name it “UseWin32TrayClockExperience” (without quotes). Set the value to 1 to go back to the Old Tray Clock and Calendar, or let it be 0 to remain with the default.

Add “Open with” to the context menu of batch files

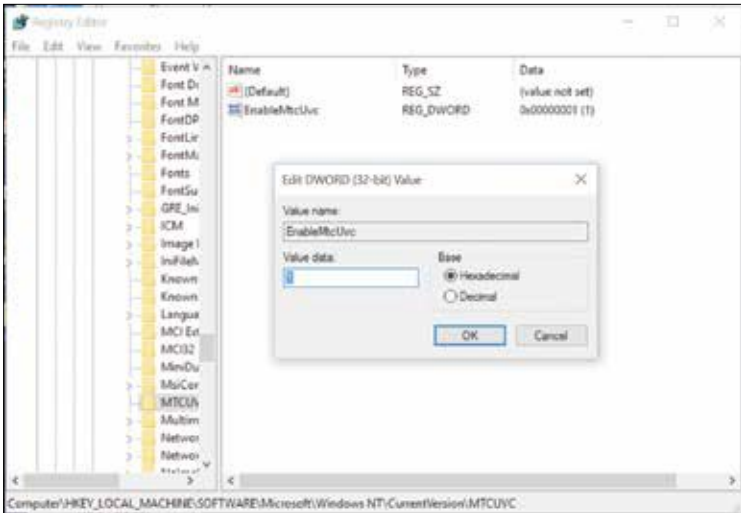
By default, Windows 10 doesn’t show the usual “Open with” option when right-clicking on a batch file. However, it is a very useful function as batch files often need to be edited and doing so from the context menu is quick and time-saving. If you are signed in as an Administrator, here’s what you have to do: open the Registry Editor and navigate to HKEY_CLASSES_ROOT > batfile > shell, and there create a New Key and name it “Open with” (without quotes).

Generate a Battery Report

Open a command prompt and type in the command “powercfg /batteryreport /output %USERPROFILE%\Desktop\battery_report.html /Duration x” (without the quotes). Replace “x” with an integer number of days from 1 to 14 which is the number of days that will be analyzed for the report. Note: You can get an xml file instead of an html file by modifying the command and replacing the extension accordingly. After running the command, open the file from your desktop.

Restore the old Volume Control

The new Volume Control UI is horizontal, while the old one was vertical and had a shortcut to the Mixer. To get back the old Volume Control UI, open the Registry Editor and navigate to HKEY_LOCAL_MACHINE > SOFTWARE



Change to the old Volume Control

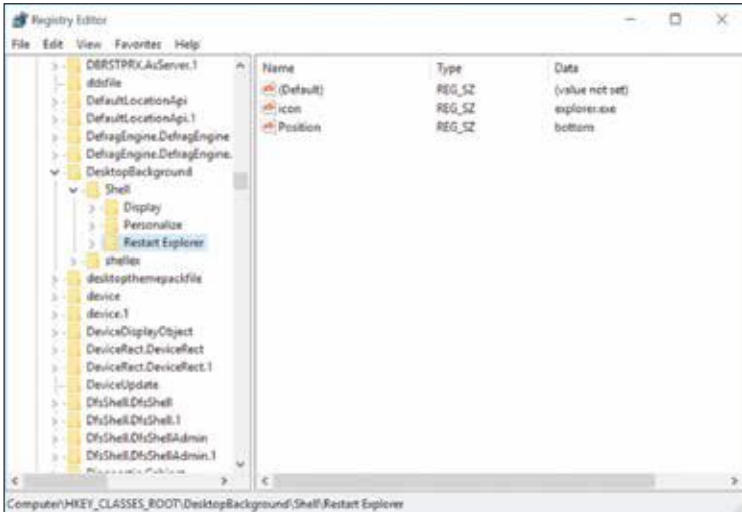
> Microsoft > Windows NT > CurrentVersion. Here, create a new key called MTCUVC, and add to it a DWORD Value named EnableMtcUvc. Set its value to 0 and see the desired change take effect.

Disable the Notification Center

If you are running Windows 10 on a desktop, or if for any other reason you consider the Action Centre a waste of memory, you can disable it completely with a simple Registry hack. Open the Registry Editor and navigate to HKEY_CURRENT_USER > SOFTWARE > Policies > Microsoft > Windows > Explorer and create a new DWORD Value in the pane on the right. Name it “DisableNotificationCenter” (without the quotes) and set its value to 1. Log off and log back in or restart to have the change take effect.

Add Restart Explorer to the Desktop context menu


In Windows, the user shell is the process called ‘explorer.exe’. This process is used by many items that form important parts of the OS such as the Desktop, File explorer, Start menu and Taskbar. If you are an active tinkerer, there will be many times that you need to restart the explorer.exe process (for example, to see certain changes in the registry). Adding a method to restart the explorer.exe process right from the context menu of the Desktop



Registry additions to restart Explorer from the desktop

saves the trouble of having to Log Out or Restart the system to accomplish the same. For this task first make a batch(text) file with these commands -

- `taskkill /f /im explorer.exe`
- `start explorer.exe`
- `exit`

Save the file as name.bat and place it in C:\Windows\System32. Next open the Registry Editor and navigate to HKEY_CLASSES_ROOT > DesktopBackground > Shell and create a new Key named "Restart Explorer". Add two String Values, named "icon" and "Position" with values "explorer.exe" and "bottom" respectively. Add a key within the former named "command" and in the value of (Default) in the right pane, enter name.bat and you should be able to use your newfound power immediately. Note: This is a slightly complex but very powerful task that should not be taken lightly under any circumstances. You are fooling around at your own risk so do so with knowledge. And as always, we did mean "without quotes". 

FOR THE DEVELOPER IN YOU

Windows 10 brings a lot of new changes aimed at developers.

With Windows 10, some of the biggest changes coming to Windows don't even have to do with its features and functionality, but on how those are delivered. Windows is moving towards Windows-as-a-Service, and this might just have a huge impact on how software targeting Windows is developed and delivered in the future.

With Windows constantly updated with new features, and no major releases every few years for users to pay for and install, developers can more reasonably expect the majority market share to be at the release. Will things really work out as well? Only time will tell, but there is more reason to expect this than there was before.

The changes under the hood are as no less massive. There are sweeping changes to Windows as a platform that can really simplify developing Windows apps and that is the new Windows Core.

Windows Core

Windows Core is Microsoft essentially realising that they own the most

popular operating system in the world, and that they should probably use it in more places. In the past Microsoft's different platforms have had rather different APIs and even different kernels.

Before Windows 8, the mobile, desktop and the Xbox's OS stacks were very different. Windows for desktops used the Windows NT kernel, phones used the CE kernel and the Xbox used its own special kernel. Windows Phone 8 finally switched to the NT kernel making it a lot similar to Windows for desktops. Xbox One further converged these platforms by switching to the same kernel as Windows 8.

While converging these kernels might have made things easier for Microsoft, it didn't benefit other developers as much.

With Windows 10 comes a true convergence of all devices to the same Windows kernel, 'universal hardware drivers', and 'standard network and I/O'. This in essence is what Windows Core is.

Not only has Windows Core expanded to all devices that already supported Windows, but the breadth of devices that support Windows has also expanded. For instance, other than PCs, tablets, and phones, the Xbox One will also soon update to use the Windows 10 core, it is already available for the Raspberry Pi 2, and of course Microsoft's new HoloLens also runs Windows 10 core.

Consolidation and convergence are huge themes with Windows 10. After unifying the Windows core across platforms Microsoft has also unified the development SDKs across platforms into what they call the Universal Windows Platform (UWP).



Universal Windows Apps can run on any Windows platform and use techniques such as adaptive UIs to run on different form factors and with different kinds of interactions patterns.

Universal Windows Platform

UWP is a layer of APIs that are guaranteed by Microsoft to be available on any device that is running Windows, whether it be a mobile phone, a PC, the Xbox, an embedded device like the Raspberry Pi or even a device that hasn't been released yet.

There are still platform-specific features, that can be layered on top of the UWP via extension SDKs. These SDKs extend the feature set of Windows for a particular family of devices. For example, the mobile family of Windows might power phones and phablets, while the desktop family on Windows will power tablets, laptops and desktops. They both have their own extension SDKs that can be used to implement platform-specific features. Microsoft estimates though that over 85% of Windows APIs are available universally.

The same application can now support multiple device families more easily, not just by using only the common UWP APIs, but by detecting and using only the features available on that platform. There is now an API to check for the presence / absence of platform-specific features and APIs.

This is different from earlier versions when such checks could only be performed at compile time in order to build different binaries for different platforms. Now runtime checks allow developers to have the same application code adapt to mobile or desktop.

Consider that Windows 10 now makes it possible to have a phone power a full desktop experience if docked to a station that has a larger screen, a keyboard and mouse. Of course this will need a very powerful phone, and might not be feasible today, but the possibility of such a thing is eminent. Microsoft's new modular approach means that the OS for such a phone could simply be a composition of the Universal Windows Platform with Mobile and Desktop extensions.

With such future devices it will be important for applications to adapt at runtime from a mobile form factor, to a desktop form factor, to even a television form factor. For this Microsoft has provided new adaptive UI elements that can work across form factors. Developers can also embrace the principles of responsive design for desktop applications – already a popular approach for web apps.

Universal Windows Platform Bridges

It's quite a mouthful, but these bridges – as we will refer to them as for brevity – are toolkits designed to make it easier for developers to bring

their existing Android, iOS, Web, and even old Windows apps and development experience to Windows 10 and to sell such apps on the Windows store.

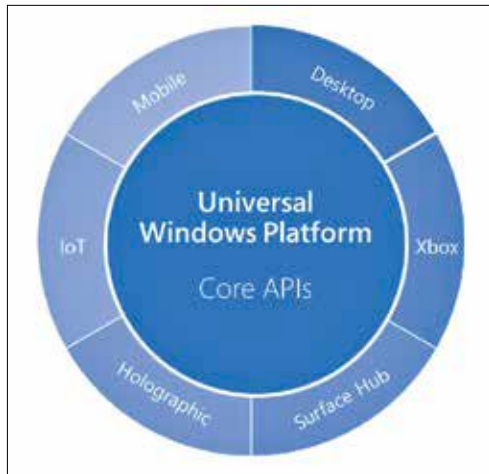
These bridging technologies are: Project Astoria for Android, Project Islandwood for iOS, Project Westminster for web applications, and Project Centennial for 'Classic Windows apps'.

Microsoft has yet to fully explain how these work, however they claim at least for Android that existing applications will need few code changes. For cases where your application uses Google services Microsoft has an interoperability layer that can map those functions to Microsoft's technologies. For instance, it has API mappings for Ads, Analytics, In-app purchases and Notifications. With minimal code changes it can make your code automatically use Bing Maps on Windows while using Google Maps on Android.

These bridges also give developers access to Windows features such as Live tiles while still being able to target competing platforms. In fact, you can even target Windows Phone using your IDE on an OS X system.

Essentially this means Android developers can continue to code in Java, iOS developers can continue to code in Objective-C (they plan to support Swift as well), web developers can continue to code in web technologies and Windows developers used to older technologies can still continue to use them. And they can still have their application running on Windows platforms and sold on the Windows store.

It's already possible to start using their compatibility layer for web applications, which allows you to have websites present as native apps in native windows. Developers can sign up for access to the other compatibility layers while they are still in development.



The new model for Windows APIs tries to as many APIs in common as possible. The only APIs missing should be those that are of no value on other platforms.



Microsoft is dreaming big, and aiming to reach a billion devices over the next 2-3 years. Cross-platform bridges are one of their efforts to enable that.

A Consolidated and Enriched Store

Gone are the platform-specific stores, with Windows 10 there is a single store for all platforms running Windows, from the Raspberry Pi to the Xbox. The same store now also offers other kinds of media such as music, and videos. For developers this also means there is now a single place to submit apps to, and the possibility of submitting a single package that can run on all platforms. The Windows store is also no longer restricted in the way it was in Windows 8. It can now support traditional Win32 applications through the compatibility layer mentioned above.

To keep users secure, apps installed from the Windows store, are sandboxed from each other and can only talk to each other through APIs designed for the purpose. One app cannot interact with another apps' settings or private data, and in fact gets its own private virtual registry. This makes it harder for malware to do anything too damaging while also making it possible to quickly and consistently uninstall apps in a way that gets rid of all their data.

The features of this unified app store have also been enhanced with the ability to offer apps on a subscription model, and to have per-market pricing. The platform is now smart enough to share libraries between different applications if they use the same version, thus reducing disk space and download sizes.

There are also interesting implications of the new constantly updating model of Windows. New updates to Windows 10 can bring new platform



The Windows 10 store now offers Apps, Music and Videos though a single storefront. Of course we wouldn't know because only Apps are available in India.

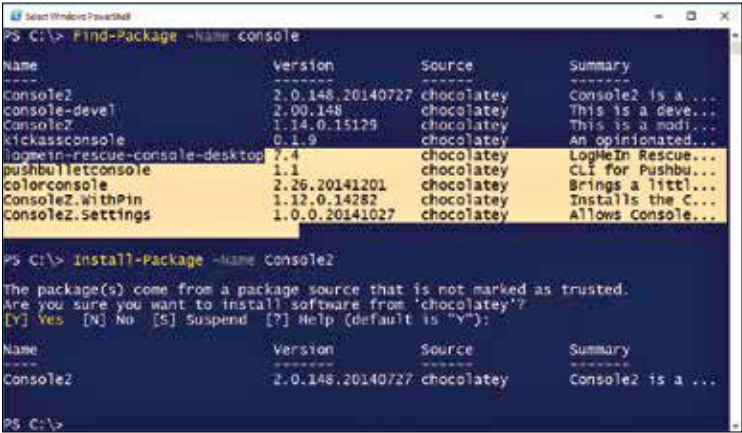
features and APIs, however any updates to these APIs are versioned. So when developing an application, you can specify the range of versions of Windows that your application supports and the device families it supports (desktop, mobile, holographic, IoT etc.). If your app runs on the oldest version of the API and uses only UWP it should run on all platforms and devices; although in practicality such apps will be few.

This is quite similar to Android's way of doing things where you can select the oldest version of Android you want to target, and that will lock you to the subset of APIs that that device supports. Another similarity with Android is the support for universal binaries. Just like it's possible to have a single Android apk that runs on any Android device be it a mobile, tablet or TV, it is now possible to have single Windows binary that that can run on any platform that supports Windows, even if that platform didn't even exist when you compiled it!

Another treat for those developing for the Windows store is the ability to hide apps pushed to the store so they can only be accessed if you know the URL. Windows Store will also soon be available as a website that people can browse and buy apps from.

Other Bits and Bobs

.NET Native: For performance conscious [.NET](#) application developers, there is some good news, now [.NET](#) applications can be compiled to native machine code. Performance isn't even the only advantage of [.NET](#) Native, unlike previous



Here you can see the new Find-Package and Install-Package commands in action in the new Windows 10 console. Also you can see the new line-by-line selection feature in action. How efficient of us.

.NET applications that needed to have the .NET Framework used by the app installed on the end-user’s machine, compiled applications are self-contained and can ship with the bits of .NET that they need to run. This means you can use the latest version of .NET without worrying about packaging the huge .NET installer with your app.

OneGet: If you’ve used Linux you’ll notice that the ease of getting and installing applications on it is unparalleled. If you want a package available for your OS, installing it is just an ‘apt-get’, ‘zypper’, ‘yum’, or ‘pacman’ command away. Windows 10 ships with a similar tool called OneGet (which can be installed on previous Windows versions as well). With OneGet you get PowerShell commands such as ‘Find-Package’ for searching for packages to install, and ‘Install-Package’ to install them. It automatically downloads the package and extracts / installs it while creating a convenient launch script. It uses the popular community-run Chocolatey service and package in for most of the work and acts as a sort for meta-package-manager that can be extended with support for other installers / package managers.

Console Improvements: Microsoft’s cmd.exe command shell is quite, quite bad, and hasn’t improved much in a long time.

Finally, with Windows 10 Microsoft has put in some work to make the experience of using ‘cmd.exe’ better.

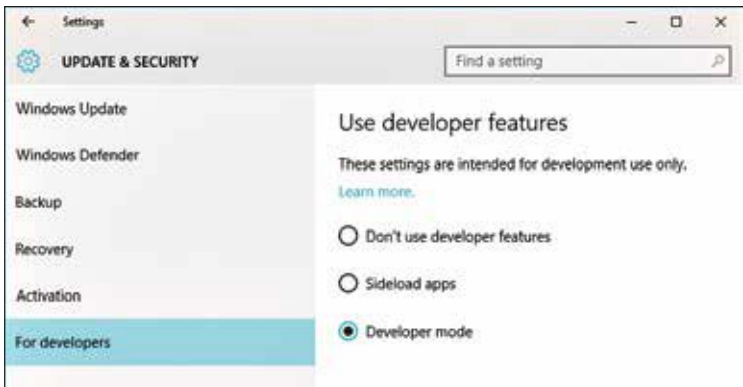
First of all, finally you can resize the console window just like any other window by dragging the edges. What's more this will automatically cause text to wrap if possible. Another great addition is the ability to easily select text in a console window without needing to access a submenu of the window menu to go into mark mode. Selecting text in the console window now works like every other window that lists text, i.e. text is selected line-by-line rather than whatever comes inside the rectangle you draw on screen. You can also do this with usual keyboard shortcuts, just press the shift and cursor keys to extend your selection and use Ctrl-C to copy and Ctrl-V to paste.

The console is now also HiDPI aware and as such won't need a magnifying glass to view on such screens. Also, you can now make the console window semi-transparent just like them people do on their Linuxes!


Summing it up

The road to a converged Windows hasn't been without its bumps –with one of those major bumps being the massively ill-thought Windows 8 – and Windows 10 is still fresh. There are surely bumps yet to come as Microsoft seems to be trying everything new all at once. It is unlikely that the Windows 10 launch will be without niggles, but Microsoft does seem to have at least some measures in place to alleviate those issues.

We have peer-to-peer downloading of updates to reduce the burden and increase performance of frequent update downloads; the promise of frequent updates in the first place to get not only fixes, but also new



No need for obscure registry hacks or shady patcher, Windows 10 can sideload apps or be put in to developer mode though the control panel.

features out quicker. Of course there is Windows Insider, Microsoft's constant pool of beta-testers using the future versions of their OS and giving feedback. With such massive changes to the Windows ecosystem, how the chips fall will only become clear perhaps a decade from now when we can compare where Windows 10 is (or whatever it's called by then) compared to now, and compared to 10 years ago when Windows XP was still the latest Microsoft OS. 

10 STEPS FORWARDS?

Windows 10 has changed a lot of things. And now the time has come for us to sum it all up for you.

Microsoft has made it quite hard to make definitive statements about Windows 10 by making it a moving target. Everything we have talked about in this booklet is true today to the best of our knowledge and experience, but a year or so from now you might read this and wonder what we're on about, because Windows doesn't work that way anymore.

Where are Microsoft planning to take Windows 10? What will the next build bring? What will Windows 10 look like two years from now. Basically, what is Microsoft thinking? We don't know, we can't know, we don't have the technology.

Constant Evolution

Devices today are constantly evolving, each new generation happens to bring something new, whether a new feature, better performance, or maybe just a better price point. The systems running on those devices need to evolve quicker too. Both Apple and Google have been pushing out updates to their platforms regularly. Yet mobile devices are still in that phase where each

version brings higher system requirements much like Windows was until Windows 7.

PCs reached the stage where the average hardware specifications stabilised a bit since we began to see a diversity in devices that ranged from tiny netbooks with meagre specs to ultra-powerful multi-core desktop machines. It forced Windows to finally step back and ensure that the OS ran acceptably on the widest range of specifications possible.

Now the base system requirements of Windows haven't changed since Windows 7 which released in 2009. Remember, back then Android was just at v 1.5 and iOS was called iPhone OS and was at v 3.0; how much both have changed since then. The iPhone 3GS that launched around that time had a single-core 600MHz processor with around 256MB of RAM. Today even some entry-level phones are touting octa-core processors with at least 1GB of RAM.

The hardware release cycle is no longer what Microsoft has to keep up with, and a release every three years doesn't give Microsoft the opportunity to respond to trends as quickly as they need to be competitive today. Given Microsoft's model of charging for each new version of Windows, they also couldn't just switch to a yearly major release for Windows without causing a revolt.

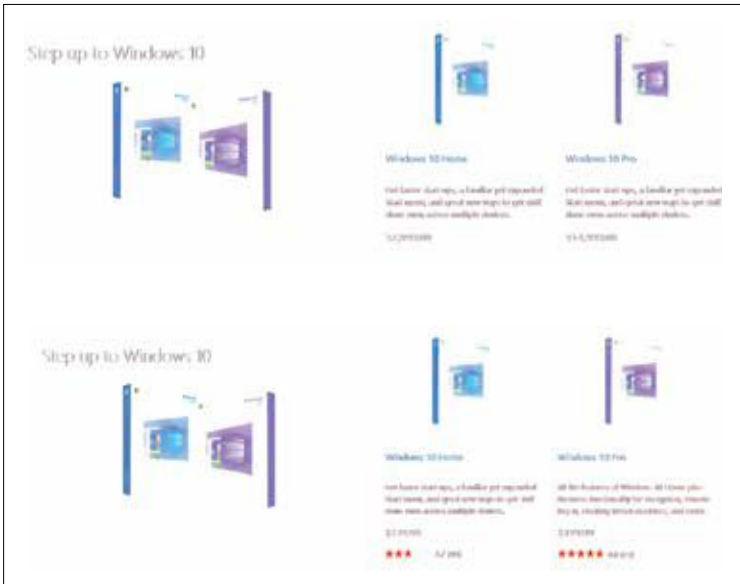
So they did what Apple did quite a while ago, they made OS upgrades free. Like Apple, Microsoft recovers some money for the OS license each time a machine is sold with Windows installed on it. In addition they also sell their OS for people to use on their existing hardware, who in turn get a life time of Windows upgrades in return.

Many of us have been running Windows 10 preview builds since they were released in October and have seen how the UI, the feature-set, the performance, and the stability of Windows has changed over the just a few months between the first preview and release. If Microsoft can keep up this pace even after release then Windows might look and feel a lot different in just a few years.

Unfair Indian Pricing

Speaking of charging money, Microsoft really has done an injustice to the Indian audience there. Given how price sensitive the Indian market is, they should ideally have priced Windows lower in India than in other countries.

Rather what you will notice is that the Indian pricing is higher than the American pricing. Where the Home edition costs \$119 in the USA (₹ 7,700



The Microsoft store for US is plastered with deep discounts and offers that we somehow don't get to see.

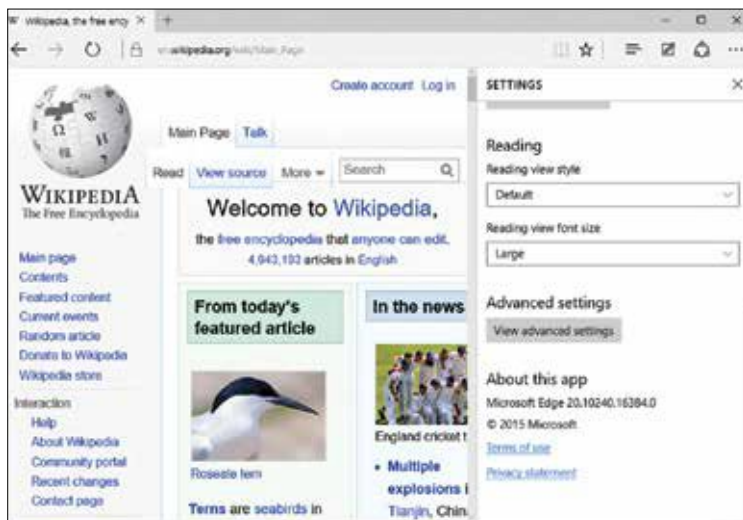
as of this writing) it costs ₹ 7,999 in India. This might still be somewhat acceptable, but it's the pricing of the pro edition that really takes the cake. The American pricing is \$199 (₹ 12,900 as of this writing), while in India it would cost you ₹ 14,999. Likewise the \$99 (₹ 6,400 as of this writing) upgrade from Home to Pro will cost Indians ₹ 7,500.

All this and we don't even get some of the Windows 10 features such as Cortana, and the music, movies and TV shows store.

It's hard to understand why the prices are what they are though. After all the common excuse given by most companies for charging more in Europe than in the USA is that support costs are higher there due to the higher employee salaries. What is the excuse in India then with salaries nearly a fifth of those in the USA?

Infrastructure is Boring

As Windows moves to a model similar to current generations of browsers, it would be wise to learn from their mistakes and evaluate what it would mean for Windows to follow in the same path.



Microsoft Edge is at version 20 already, cause yes, versions numbers are meaningless.

When Chrome released, Google would release a new version every 12 weeks. They soon shortened this to 6 weeks but the important thing is that the attention of most people at that time was in comparing Firefox to Chrome and complaining about how Firefox was not progressing fast enough.

Each release of Chrome would widen the gap between Firefox and Chrome and make these comparisons less favourable to Firefox. Since Firefox moved to a rapid release cycle of a new version every 6 weeks, those articles have trickled down to mostly nothing.

However what has also trickled to nothing is the free promotion Firefox would get in the form of release announcements. Between 2004, and 2011 Firefox went from v 1.0 to v 4.0, and had only 7 releases (1.0, 1.5, 2.0, 3.0, 3.5, 3.6, and 4.0). Since then Firefox has reached v 40 as of this writing.

When Firefox released once in many months, it would get press coverage for certain. Now it's just a routine, and no one says anything.

Partially this is because browsers are like basic infrastructure (or the weather), it's boring to talk about till something goes horribly wrong.

Windows too, as an OS is just infrastructure. It isn't interesting; it isn't meant to be. It is something that should facilitate interesting things, not be interesting itself. If the OS is the most exciting thing you interact with on your computer, you really need to expand what you do with your computer.

Once the cycle of updates starts rolling, it's only a matter of time before new builds of Windows become boring. Every once in a while you'll hear of a new feature that's coming out, but mostly people will move on.

Upgrade Pains

It seems that Windows 10 updates have already begun creating a stir. A faulty update caused some devices to go into a reboot loop, where the update installation would fail, the computer would reboot, and then the update would again start installing. People managing driver updates themselves found Windows overriding their updates Microsoft-supplied drivers.

Neither of these would have been a problem if users had some control over updates. For the case of drivers Microsoft has released a tool that users can use to blocks certain driver updates – which in previous Windows versions had been optional. However for security patches that go wrong, there isn't any way out.

It's understandable why Microsoft is doing this, their job is much easier if each update can rely on the previous update being installed. However there are real world problems that they haven't fully solved yet, like the ones that led to the above cases.

We've talked about how keeping security updates mandatory is a good idea even if it negatively affects a few computers. However the solution isn't for those people to just be collateral, after all one update might affect 0.1% of users, but over hundreds of updates over the years, the number of people negatively affected by at least one update will grow. Microsoft needs to be able to manage this better. It's still new for them, so we can hope they will figure things out.

```

The following running processes use deleted files:

```

PID	PPID	UID	User	Command	Service	Files
75166	1	1000	xixi	SSH Worker		/usr/lib64/firefox/libmozalloc.so /usr/lib64/firefox/libmozsqlite3.so /usr/lib64/firefox/libssl.so /usr/lib64/firefox/omni.ja /usr/lib64/firefox/firefox (deleted) /usr/lib64/firefox/browser/components/libmo- /usr/lib64/firefox/components/libmozglue.so /usr/lib64/firefox/browser/omni.ja /usr/lib64/firefox/components/libbusserv-

```

You may wish to restart these processes.
See "man top" for information about the meaning of values in the above table.

Note: Not running as root you are limited to searching for files you have permission to examine
with the system stat(2) function. The result might be incomplete

xixi at xixi-machine LN 7

```


Firefox has been updated while it was still running. No biggie, just restarting Firefox will start using the new version.

Over the numerous builds of Windows that were released via the Insider program, one thing became clear, upgrades are still a pain on Windows. They take enormous amounts of time, and can require multiple reboots.

Microsoft needs to look at the platforms that have been doing constant upgrades for many years now. Linux distributions like Ubuntu and Fedora have been bringing new distribution releases every six months since many years now – over a decade in case of Ubuntu. Even more extreme examples are Arch, Gentoo, and OpenSUSE Tumbleweed which use a rolling release system where new updated applications and delivered almost daily.

Updates and upgrades on Linux rarely disrupt the work you are doing. Linux programmers and distributors and have made it a priority to ensure that critical applications can keep running while Linux updates, and suffer minimal downtime. The only thing that requires a reboot is a kernel upgrade, and even for that there are tools like kgraft, ksplice and kexec to update the kernel without a restart on servers.

Windows is at a disadvantage here. See on Linux it is possible to delete a file, even uninstall an entire application while it is still running. A deleted file can still be accessed by an application that has opened it. The result of this is that it's possible to replace an application with a newer version without needing to close it. If you want to start using the updated version, just close the application and start it again.

This is simply not how Windows is built. Windows updates require complex orchestration to pass over control from the old version to the new, and Microsoft really needs to make this work better and faster, because it's no longer an optional pain that people have to endure every 3 years if they decide to upgrade, it is now part of the Windows experience. 



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devworx, a niche community for software developers in India, is supported by 9.9 Media, publishers of Digit

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- Events
- Groups
- Pages
- Places
- Video